

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/31/07  
**Date:** Monday, December 31, 2007 12:30:12 PM  
**Attachments:** [image001.gif](#)

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## ISS On-Orbit Status 12/31/07

**New Year's Eve...** 16 times for the Expedition 16 crew of CDR Peggy Whitson (m), FE-1 Yuri Malenchenko (l) and FE-2 Dan Tani (r) while counting down to 2008!



All ISS systems continue to function nominally, except those noted previously or below.  
*Crew off-duty day. Underway: Week 11 of Increment 16.*

Peggy and Dan began the day with the daily reading of SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) experiment data accumulated during the night, for logging and filling in questionnaire entries in the experiment's session file on the HRF-1 laptop for downlink. *[To monitor the crewmembers' sleep/wake patterns and light exposure, Dan and Peggy wear a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

The CDR continued her support of the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment in the MSG (Microgravity Science Glovebox) facility. *[Today, Whitson activated the MSG, closed the vacuum vent, checked for acceptable humidity levels, and opened the SPU-10 (Sample Processing Unit #10) water valve to initiate unattended vacuum preparation. Later, in Step 2, she reset MSG, closed the water valve, again*

*checked for acceptable humidity levels in the sample chamber, then opened the vent & vacuum valves to initiate the required vacuum draw on the sample chamber. CSLM-2 examines the kinetics of competitive particle growth within a liquid matrix. During this process, small particles shrink by losing atoms to larger particles, causing the larger particles to grow (coarsen) within a liquid lead/tin matrix. This study defined the mechanisms and rates of coarsening that govern the manufacture with metals from turbine blades to dental amalgam fillings.]*

Peggy also checked the MELFI (Minus Eighty Degree Laboratory Freezer for ISS) to see whether its current N<sub>2</sub> (nitrogen) pressure is in acceptable range.

FE-2 Tani performed the daily status check on the BCAT-3 (Binary Colloidal Alloy Test-3) science payload, running by itself in Node-2 since 12/13 (briefly interrupted for EVA-13 photo support). The status check, conducted on the last image taken by the DCS 760 digital still camera which is controlled by EarthKAM software on an A31p laptop, is to verify proper image focus and camera alignment. *[The SSC (Station Support Computer) is taking photography of the phase separation occurring in the BCAT Sample 3, with the photo flash going off every half hour.]*

Dan also worked on the OpsLAN (Operations Local Area Network), disconnecting the IBM 760XD laptop from the OCA router assembly and stowing it away for use as a future Russian spare.

The CDR ran the periodic check of active U.S. payloads, i.e., cleaning the ANITA (Analyzing Interferometer for Ambient Air) inlet plus inspecting and filter cleaning of the CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The CGBA incubator is controlled from the ground, with automatic video downlinked to Earth. ANITA continues to collect data every six seconds and downlinks the data daily to the ground team. ANITA monitors low levels of potential gaseous contaminants in the ISS cabin atmosphere with a capability of simultaneously monitoring 32 gaseous contaminants. The experiment is testing the accuracy and reliability of this technology as a potential next-generation atmosphere trace-gas monitoring system for ISS and future spacecraft. This is a cooperative investigation with ESA.]*

FE-1 Malenchenko dumped application software log files from the Russian BVS (Onboard Computer System) RS3 laptop to a CD-ROM disk for subsequent downlink to the ground.

Whitson & Tani assembled and configured new equipment from the ACS (Atmosphere Control System) modification kit for installation in the Regenerative ECLSS (Environment Control & Life Support System). *[In support of the activities, the ground temporarily deactivated the LAB1PD1 rack smoke detector.]*

Malenchenko completed of the routine servicing of the SOZh system (Russian ECLSS) in the SM (Service Module). *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

With the Elektron oxygen (O<sub>2</sub>) generator turned off since 12/28, Yuri performed a 1-hour O<sub>2</sub> repress of the cabin atmosphere from Progress M-62/27P storage tankage. *[The Elektron will remain powered down until 1/9/08 to conserve hardware lifetime. During this time, the station will be periodically repressurized with oxygen from Progress 27P.]*

The crew worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Dan Tani copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~5:40am EST, Peggy & Dan supported an interactive PAO interview event on ABC-TV's "Good Morning America" (David Muir), via Ku- and S-band.

CEO photo targets uplinked for today again were **Polar Mesospheric Clouds** — (PMC - also known as noctilucent clouds) over selected ground sites (12 minutes for each). *(Southern spring is the season for relatively uncommon polar mesospheric clouds to form very high over Antarctica. PMC are being studied as part of the International Polar Year [IPY] investigation of climate change in high latitudes. PMC form in the stratosphere and higher, i.e. well above the lowest layer of the atmosphere [troposphere, or weather layer, characterized by clouds, and an orange tinge produced by brushfire smoke, smog, etc.]. The AIM satellite (Aeronomy of Ice in the Atmosphere) has recently been launched to investigate how PMC form and why they are apparently becoming thicker and brighter. ISS/CEO imagery will complement images from AIM and from the ground. The collaborating IPY scientist is excited to receive any images ISS may acquire. Collaborating Swedish scientists are now working at a base in Antarctica (73S 13 W) for PMC observation.)*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:09am EST [= epoch]):

Mean altitude -- 335.5 km

Apogee height -- 336.7 km

Perigee height -- 334.3 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0001773  
Solar Beta Angle -- -65.6 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in the last 24 hours -- 75 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 52191

**Significant Events Ahead** (*all dates Eastern Standard, some changes possible. NET = Not Earlier Than*):

TBD -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.  
TBD -- STS-122/Atlantis/1E docking  
TBD -- STS-122/Atlantis/1E undocking  
01/31/08 -- **Explorer-1 50 Years (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [*Check it out at <http://usspace50.com>*]  
02/06/08 -- Progress M-62/27P undocking & reentry  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking (DC1)  
02/22/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/06/08 -- ATV-1 Demo Day 1  
03/12/08 -- ATV-1 Demo Day 2  
03/15/08 -- ATV-1 Demo Day 3 & Docking (SM aft port)  
04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
08/07/08 -- NET: ATV-1 undocking (from SM aft port)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/09/08 -- Progress M-64/29P undocking (from DC1)  
09/10/08 -- Progress M-66/31P launch  
09/12/08 -- Progress M-66/31P docking (DC1)  
09/18/08 -- STS-126/Discovery/ULF2 launch -- MPLM Leonardo, LMC  
09/20/08 -- STS-126/Discovery/ULF2 docking  
10/01/08 -- STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **NASA 50 Years**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)

10/12/08 -- Soyuz TMA-13/17S launch  
10/14/08 -- Soyuz TMA-13/17S docking (SM aft port)  
10/23/08 -- Soyuz TMA-12/16S undocking (FGB nadir)  
11/03/08 -- Soyuz TMA-13/17S relocation (from SM aft to FGB nadir)  
11/06/08 -- STS-119/Discovery/15A launch – S6 truss segment  
11/08/08 -- STS-119/Discovery/15A docking  
11/17/08 -- STS-119/Discovery/15A undocking  
11/20/08 -- **ISS 10 Years**  
11/26/08 -- Progress M-67/32P launch  
11/28/08 -- Progress M-67/32P docking (SM aft port)  
04/15/09 -- **Constellation's Ares I-X Launch**  
05/??/09 -- **Six-person crew on ISS** (following Soyuz 18S-2 docking)  
04/??/10 -- STS-132/Discovery/20A – Node-3 + Cupola.

Note: The daily ISS On-Orbit Status reports can also be found at  
[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/30/07  
**Date:** Sunday, December 30, 2007 2:46:11 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/30/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for CDR Whitson, FE-1 Malenchenko and FE-2 Tani. New Year's Eve's Eve! Ahead: Week 11 of Increment 16.*

Peggy Whitson and Dan Tani began the day with the daily reading of SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) experiment data accumulated during the night, for logging and filling in questionnaire entries in the experiment's session file on the HRF-1 laptop for downlink. *[To monitor the crewmembers' sleep/wake patterns and light exposure, Dan and Peggy wear a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

The crew performed the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

Continuing his troubleshooting of the Russian SKV2 air conditioner, FE-1 Malenchenko finished cleaning the condensate line that pulls condensate from the SKV-2 air conditioner by means of the NOK-2 condensate evacuation pump. *[On 12/28, Yuri had found a "rubbery, jelly-like" substance inside the inlet line of which he at that time removed as much as he could. The remainder of the pipe was cleaned today. The NOK-2 pump was to be permanently installed once the condensate & inlet line cleaning is complete. These activities are in support of SKV-2 troubleshooting that began after SKV-2 and the SRVK condensate processing*

*unit in the RS (Russian Segment) shut down on 12/23 (last Sunday). SRVK and SKV-2 both remain operational, but are currently deactivated. SKV-1 has been inoperable for some time.]*

Afterwards Malenchenko terminated the test compression of the Progress Rodnik BV1 & BV2 water tank bladders, to check for leak tightness, and tore down the pumping equipment for stowage. *[Each of the spherical Rodnik tanks BV1 & BV2 consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before water transfer and the subsequent reception of liquid waste for disposal.]*

With the Elektron oxygen (O<sub>2</sub>) generator turned off since 12/28, Yuri was scheduled today to perform a 1.5-hour O<sub>2</sub> repress of the cabin atmosphere from Progress M-62/27P storage tankage, upon TsUP Go. *[The Elektron will remain powered down until 1/9/08 to conserve hardware lifetime. During this time, the station will be periodically repressurized with oxygen from Progress 27P.]*

FE-2 Tani performed the daily status check on the BCAT-3 (Binary Colloidal Alloy Test-3) science payload, running by itself in Node-2 since 12/13 (briefly interrupted for EVA-13 photo support). The status check, conducted on the last image taken by the DCS 760 digital still camera which is controlled by EarthKAM software on an A31p laptop, is to verify proper image focus and camera alignment. *[The SSC (Station Support Computer) is taking photography of the phase separation occurring in the BCAT Sample 3, with the photo flash going off every half hour.]*

CDR Whitson continued her support of the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment in the MSG (Microgravity Science Glovebox), today transferring the data for SPU-13 (Sample Processing Unit 13) from the ECU (Electronics Control Unit) to the MSG Laptop, then removing SPU-13 from the WV (Work Volume) and reinstalling SPU-10 for double-checking its humidity. MSG will then be powered down. *[If humidity level checks out correctly at 99%, that will be the end of CSLM-2 operations.]*

Malenchenko also completed of the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers. Weekly SOZh reports (on Sundays) to TsUP/Moscow deal with number & dates of water and urine containers, counter readings of water consumption & urine collection, and total operating time of the POTOK air filtration system.]*

After Houston Flight Controllers deactivated the CDRA (Carbon Dioxide Removal Assembly) late yesterday (~5:00pm EST) when Dan Tani's work with the SPHERES experiment was finished, and cooling was no longer required, Peggy Whitson today disconnected the ITCS LTL QD (Internal Thermal Control System/Low Temperature Loop/Quick Disconnect) jumper to the CDRA (LAB1D6) rack.

The crew worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Working from his discretionary "time permitting" task list, the FE-1 also completed another radiation data monitoring & logging session for flow & dose power data with the Matryoshka-R radiation payload and its LULIN-5 electronics box.  
*[Accumulated readings were recorded on a log sheet for subsequent downlink to TsUP/Moscow via the BSR-TM payload data channel.]*

Led by Yuri Malenchenko, at ~5:00am EST the crew donned their flight suits and supported three formal live PAO TV downlinks with greetings and congratulations to special Russian educational events, viz. --

1. Moscow Region Scientists on Russia's annual Science Day *[Russian Science Day is celebrated annually on February 8. "...the crew of the International Space Station is extending their heartfelt greetings to extraordinary scientists, engineers, and designers of the Moscow Region and wishes them a Happy Russian Science Day."];*
2. Participants of a Scientific Conference dedicated to the 50<sup>th</sup> Anniversary of the Space Era *["...these days when humankind enters the second half century of the Space Era having celebrated its 50th anniversary, you are gathered to once again remember and honor the individuals who made it possible for humanity to break into space and open it for further exploration. By a quirk of history, many of these trailblazers were men and women in uniform. While not forgetting about defending the Motherland, these people, still hot from the battles of the Great Patriotic War, channeled their thoughts and deeds to purely peaceful objectives. One of such tasks had literally cosmic proportions... Long live the Union of Space Force Veterans!"]; and the*
3. Second Russian Youth Science Readings in honor of Sergey Pavlovich Korolev *[scheduled for January 18-19, with the participation of university and grade-school students from Moscow, Moscow Oblast, St. Peterburg, Archangel, Vologda, Irkutsk, Kaluga, Nizhny Novgorod, Novosibirsk, Samara, Republic of Kazakhstan and Ukraine. Location: the S.P. Korolev Memorial Museum, newly opened a year ago after renovation. (Main*

*objectives of the Readings: “To stimulate trainees for in-depth study of the achievements of cosmonautics, to scout and provide support for gifted students, to promote innovative aerospace educational programs using Earth images from space, and to provide career guidance to a younger generation.”]]*

The crewmembers each had a “New Year’s Eve’s Eve” PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-10 laptop), Yuri at ~4:00am, Peggy at ~12:40pm, and Dan at ~2:55pm.

CEO photo targets uplinked for today again were **Polar Mesospheric Clouds** — (PMC - also known as noctilucent clouds) over selected ground sites (12 minutes for each). *(Southern spring is the season for relatively uncommon polar mesospheric clouds to form very high over Antarctica. PMC are being studied as part of the International Polar Year [IPY] investigation of climate change in high latitudes. PMC form in the stratosphere and higher, i.e. well above the lowest layer of the atmosphere [troposphere, or weather layer, characterized by clouds, and an orange tinge produced by brushfire smoke, smog, etc.]. The AIM satellite (Aeronomy of Ice in the Atmosphere) has recently been launched to investigate how PMC form and why they are apparently becoming thicker and brighter. ISS/CEO imagery will complement images from AIM and from the ground. The collaborating IPY scientist is excited to receive any images ISS may acquire. Collaborating Swedish scientists are now working at a base in Antarctica (73S 13 W) for PMC observation.)*

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Perigee height -- 334.4 km

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Solar Beta Angle -- -69.5 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

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Revolutions since FGB/Zarya launch (Nov. 98) -- 52176

**Significant Events Ahead** *(all dates Eastern Standard, some changes possible.*

*NET = Not Earlier Than):*

TBD -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.

TBD -- STS-122/Atlantis/1E docking

TBD -- STS-122/Atlantis/1E undocking

01/31/08 -- **Explorer-1 50 Years (1<sup>st</sup> U.S. Satellite on Redstone rocket)** *[Check it out at <http://usspace50.com>]*

02/06/08 -- Progress M-62/27P undocking & reentry

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking (DC1)

02/22/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour undocking

02/29/08 -- STS-123/Endeavour landing

03/06/08 -- ATV-1 Demo Day 1

03/12/08 -- ATV-1 Demo Day 2

03/15/08 -- ATV-1 Demo Day 3 & Docking (SM aft port)

04/07/08 -- Progress M-63/28P undocking (DC1) & reentry

04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)

04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)

04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS

04/26/08 -- STS-124/Discovery/1J docking

05/04/08 -- STS-124/Discovery/1J undocking

05/14/08 -- Progress M-64/29P launch

05/16/08 -- Progress M-64/29P docking (DC1)

08/07/08 -- NET: ATV-1 undocking (from SM aft port)

08/12/08 -- Progress M-65/30P launch

08/14/08 -- Progress M-65/30P docking (SM aft port)

09/09/08 -- Progress M-64/29P undocking (from DC1)

09/10/08 -- Progress M-66/31P launch

09/12/08 -- Progress M-66/31P docking (DC1)

09/18/08 -- STS-126/Discovery/ULF2 launch -- MPLM Leonardo, LMC

09/20/08 -- STS-126/Discovery/ULF2 docking

10/01/08 -- STS-126/Discovery/ULF2 undocking.

10/01/08 -- **NASA 50 Years**

10/11/08 -- Progress M-65/30P undocking (from SM aft port)

10/12/08 -- Soyuz TMA-13/17S launch  
10/14/08 -- Soyuz TMA-13/17S docking (SM aft port)  
10/23/08 -- Soyuz TMA-12/16S undocking (FGB nadir)  
11/03/08 -- Soyuz TMA-13/17S relocation (from SM aft to FGB nadir)  
11/06/08 -- STS-119/Discovery/15A launch – S6 truss segment  
11/08/08 -- STS-119/Discovery/15A docking  
11/17/08 -- STS-119/Discovery/15A undocking  
11/20/08 -- **ISS 10 Years**  
11/26/08 -- Progress M-67/32P launch  
11/28/08 -- Progress M-67/32P docking (SM aft port)  
04/15/09 -- **Constellation's Ares I-X Launch**  
05/??/09 -- **Six-person crew on ISS** (following Soyuz 18S-2 docking)  
04/??/10 -- STS-132/Discovery/20A – Node-3 + Cupola.

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**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/29/07  
**Date:** Saturday, December 29, 2007 2:23:52 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/29/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- off-duty day for CDR Whitson, FE-1 Malenchenko and FE-2 Tani except for housekeeping and voluntary work.*

Whitson and Tani began the day with the daily reading of SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) experiment data accumulated during the night, for logging and filling in questionnaire entries in the experiment's session file on the HRF-1 laptop for downlink. *[To monitor the crewmembers' sleep/wake patterns and light exposure, Dan and Peggy wear a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

Preparatory to potable water transfer from Progress M-62/27P to the Service Module (SM), FE-1 Malenchenko set up pumping equipment and initiated the compression of the Progress Rodnik BV1 tank bladder, monitoring air flow to check for leak tightness (hermeticity). Later, the FE-1 switched the compressor to the second tank, BV2, for the bladder check. *[Each of the spherical Rodnik tanks BV1 & BV2 consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before water transfer and the subsequent reception of liquid waste for disposal.]*

Yuri Malenchenko later worked on the Russian SOTR Thermal Control System, performing connection tests on the jumper cables installed yesterday between the KMTK Triple Channel Matrix Commutator switch and the PUVN Cabin Air Heater Control Panel, and activating the 1N1 & 2N1 pumps of the two active external thermal control systems (KOKh1, KOKh2) of the SM.

After a brief familiarization review of reference material, FE-2 Dan Tani conducted

another session with the payload SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites), which he had selected for today's Voluntary Weekend Science program. In support of this interesting experiment, the ground yesterday activated CDRA (Carbon Dioxide Removal Assembly) and will turn it off later today (~5:00pm EST). *[Today's session concentrated on the ability of a single crewperson to deploy three satellites with the assistance of a "Position Hold" mode. Due to the different air flows introduced with the addition of Node-2, the former operational environment has changed, making 3-satellite deployments more challenging. The SPHERES experiment is a test bed for the development and testing of formation flying and other multi-spacecraft control algorithms. SPHERES, done first by FE-1 Jeff Williams on Expedition 13, serves to mature autonomous satellite formation flight, rendezvous and docking algorithms in a long duration, microgravity environment. Dan set up the Work Area, dimmed GLAs (General Luminaire Assemblies), programmed & deployed three gas-propelled satellites (orange, red, blue), with five beacons, and used two PD-100 camcorders for video capture. Per applicable Flight Rule, SPHERES operations have no CO<sub>2</sub> (Carbon Dioxide) output constraints if the CDRA (CO<sub>2</sub> Removal Assembly) is operating in dual-bed or single-bed mode. Should CDRA not work properly, ECLSS (Environmental Control & Life Support System) engineers will assess the ppCO<sub>2</sub> flight rule requirement. The experiment run was time-critical since Ku-band is required for real-time video downlink.]*

Later, Dan conducted the visual microbial (bacterial & fungal) "T+5 Day" analysis of surface samples which he collected on 12/24 with the SSK (Surface Sampling Kit) at specific locations near air diffusers. *[The sampling analysis is performed once per month for the first three months, and once every three months thereafter. Bacterial and fungal air samples are taken at two locations in each module. The colony growth on the sampling slides is analyzed after five days of incubation in four Petri dishes. For onboard visual analysis of media slides from SSK (Surface Sampling Kit), MCDs (microbial capture devices) from WMK (Water Monitoring Kit), coliform detection bags from MWAK (Microbial Water Analysis Kit), and Petri dishes from the MAS (Microbial Air Sampler) kit, the crew has a procedure for visual inspection of samples for bacterial and fungal colony growths after appropriate incubation periods.]*

CDR Whitson continued her support of the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment in the MSG (Microgravity Science Glovebox) by terminating vacuum venting on SPU-13 (Sample Processing Unit 13), powering up the ECU (Electronics Control Unit) and started experiment operations by initiating sample heating.

In Node-2, FE-2 Tani worked on the BCAT-3 (Binary Colloidal Alloy Test-3) science

payload (running since 12/13), today mixing Sample 3 again (since the previous run probably was corrupted) and monitoring the start of the next 2-week run. *[Dan also took detailed documentary photos of the setup to show the exact angles and locations of the flash, camera, and sample module for ground scientists to better understand the lighting in the images and also for upcoming crew training sessions and procedures. An SSC (Station Support Computer) laptop is taking photography of the phase separation occurring in the BCAT Sample 3, with the photo flash going off every half hour.]*

With SAMS (Space Acceleration Measurement System), used to monitor last night's 27P thruster firing tests, currently no longer required, Peggy configured the ER1 (EXPRESS Rack 1) by disconnecting its MTL (Moderate Temperature Loop) cooling jumper QDs (quick disconnects) to the nearby LAB1O2 UIP (Utility Interface Panel, "Z-panel").

The FE-1 continued the current round of periodic preventive maintenance of cabin ventilation systems in the RS (Russian Segment), today cleaning "Group A" fan grilles in the SM.

Malenchenko also completed of the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Later, Yuri conducted the daily 20-min. IMS (Inventory Management System) maintenance, updating/editing its standard "delta file" including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Malenchenko also performed an update on the "Sigma" BNO (Ballistic Navigation Program) software on two Russian laptops, RSK1 & EGE-2 (in DOS), essentially updating ballistic service files for the new calendar year 2008 ahead, to prevent slowdown of the application (which computes real-time position of the ISS over the ground).

The crew worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Dan Tani copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate

Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from his discretionary "time permitting" task list, the FE-1 also performed the periodic collection & deletion of readings on the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the RBO-3-2 Matryoshka-R anthropomorphic (human torso) "phantoms" located inside the station for sophisticated radiation studies, collecting radiation measurements every 15 minutes around the clock.

Led by Yuri Malenchenko, the crew supported two formal live PAO TV exchange sessions with visitors at TsUP-Moscow, viz. --

(1) At ~11:55pm EST (last night), with a gathering of top officials of FKA/Roskosmos (Anatoly Perminov), RSC-Energia (Vitaly Lopota), TsNIIMASH (Nikolai Anfimov) GCTC (Vasily Tsibliyev), IBMP (Anatoly Grigorievich), Moscow Mayor's Office (Lyudmila Shvetsova), Vologda Region Governor's Office (Nicolai Vinogradov), Interagency State Commission (Valery Grin), and – last not least – Father Frost; and

(2) At ~2:45am, a Press Conference with mass media representatives (Channel One TV, NTV Channel, Zvezda TV Channel, Russia Today TV Channel, ITAR-TASS Russian Information & Telegraph Agency, INTERFAX Information Agency, RIA Novosti Information-Analytical Agency, Kaliningradskaya Pravda Newspaper, and others).

*Elektron Deactivation:* The FE-1 and TsUP specialists yesterday performed a planned deactivation of the Elektron. As part of the deactivation process the Elektron was purged with N<sub>2</sub> (nitrogen). The FE-1 had to swap the RS Laptop 1 with Laptop 2 to complete the purge successfully. The Elektron will remain powered down until 1/9/08. During this time, the station will be periodically repressurized with oxygen from Progress 27P.

*Crew Provisions Audit:* CDR Whitson yesterday completed a portion of the Increment 16 Crew Provisions Audit, going by an uplinked work sheet. The audit was performed to update onboard crew provision quantities for IMS accuracy and resupply planning. Some of the items audited included miscellaneous workout equipment and crew hygiene and clothing items.

### **Weekly Science Update** (Expedition Sixteen -- Week 10)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* In progress.

*ANITA*: Completed.

*BCAT (Binary Colloidal Alloy Test)*: BCAT-3 has had a very successful week. Dan has successfully set up BCAT-3 on the ceiling seat tracks and handrails in Node-2 after seeing that he did not need to use the MWA surface to mount and run the experiment. He may have remembered seeing a future setup option during BCAT-4 training, which was designed to not monopolize the often needed MWA surface, while allowing BCAT to be able to be run, uninterrupted, for far longer periods of time. Researchers are particularly grateful for Dan's continued willingness to tweak the setup, interactively, as they receive images automatically from EarthKAM. After several rounds of minor tweaks, the photos are now as good as any seen from the MWA-based setups. "This is great news as we are trying to get the similar alternate setup into the system for the future BCAT-4 runs."

*CARDIOCOG-2*: Completed.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS)*: Reserve.

*CFE (Capillary Flow Experiment)*: Reserve.

*CSI-2/CGBA (CGBA Science Insert #2/Commercial Generic Bioprocessing Apparatus)*: In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2)*: Complete.

*CSLM-2 (Coarsening in Solid-Liquid Mixtures 2)*: "1.) SPU-11 (10.17 hour soak) - It appears that the quench did not occur as intended. The data was downloaded and analyzed and the normal quick cool down did not occur. It is possible that we may be able to get good data from SPU-11 (10.17 hour soak); we won't know until we look at the samples. 2.) SPU-10 (4 hour soak planned) - The temperature and humidity (99%) indicated a dew point of 18.8°C which is above the max of 16°C required to permit us to connect to the VES. Possible causes: A) Failed humidity sensor in the SPU, or B) Failed circuit in the ECU that reads the humidity sensor, or C) Water system malfunction allowing the water to enter the chamber prematurely. 3.) SPU-13 (1.6 hour soak planned) is currently being evacuated which means that the humidity (30%) and temp (22C) was good to allow connecting to the VES. Once SPU-13 is completed we may go back and install SPU-10 again. This will allow us to re-check the humidity, but it is likely that the humidity sensor in this SPU has failed and thus is giving a maxed out reading."

*EarthKAM (Earth Knowledge Acquired by Middle School Students)*: Complete.

*EPO (Educational Payload Operations)*: Reserve.

*ETD (Eye Tracking Device):* In progress.

*Integrated Immune:* In progress.

*KUBIK-FM1/ KUBIK-FM2 Centrifuge/Incubators:* Completed.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):*  
Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* MULTIGEN-1 samples will be downloaded on STS-122 (1E).

*MSG-SAME (Microgravity Science Glovebox):* Complete.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION/REPOSITORY:* "Peggy did a great job completing the FD60 Nutrition/Repository run. Blood operations were completed in record time".

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):*  
Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Peggy completed the Actiwatch download/initialization activity off the task list. The ground will downlink those files soon and send them to the PI. "We appreciate the additional sleep logging. Peggy is going above and beyond the requirements, and the PI greatly appreciates it. We will still add sleep logging to Peggy's task list during weeks she will be sleep shifting." Dan completed his second week of sleep logging. "We still need to capture eleven days of sleep logging to fulfill the requirement. We will make sure these are on Dan's task list. We appreciate Dan's participation".

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):*  
In progress. To be conducted tomorrow (12/2).

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observation):* On-going.

CEO photo targets uplinked for today again were **Polar Mesospheric Clouds — PMC, Antarctica** (*IPY--PMC radar research station active. GMTs for this and PMC opportunities, uplinked, have been chosen for closeness to the Antarctic PMC radar research site at 73S 13W. Radar is switched on during ISS passes at the GMTs uplinked. But the crew was to feel free to look south during any night awake pass*), **Hyderabad, India** (*this enormous urban area has an estimated 6.1 million people. It is India's sixth largest metro area. ISS had a nadir pass: the crew was to shoot city margins*), and **Khartoum, Sudan** (*looking right for this city, which lies on both sides of the Nile, at the confluence of the White and Blue Niles (the visual cue from ISS)*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:49am EST [= epoch]):

Mean altitude -- 335.6 km

Apogee height -- 336.7 km

Perigee height -- 334.6 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0001506

Solar Beta Angle -- -72.6 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 24 hours -- 58 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 52160

**Significant Events Ahead** (*all dates Eastern Standard, some changes possible.*

*NET = Not Earlier Than):*

TBD -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.

TBD -- STS-122/Atlantis/1E docking

TBD -- STS-122/Atlantis/1E undocking

01/31/08 -- **Explorer-1 50 Years (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [*Check it out at <http://usspace50.com>*]

02/06/08 -- Progress M-62/27P undocking & reentry  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking (DC1)  
02/22/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM  
ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/06/08 -- ATV-1 Demo Day 1  
03/12/08 -- ATV-1 Demo Day 2  
03/15/08 -- ATV-1 Demo Day 3 & Docking (SM aft port)  
04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
08/07/08 -- NET: ATV-1 undocking (from SM aft port)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/09/08 -- Progress M-64/29P undocking (from DC1)  
09/10/08 -- Progress M-66/31P launch  
09/12/08 -- Progress M-66/31P docking (DC1)  
09/18/08 -- STS-126/Discovery/ULF2 launch -- MPLM Leonardo, LMC  
09/20/08 -- STS-126/Discovery/ULF2 docking  
10/01/08 -- STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **NASA 50 Years**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/12/08 -- Soyuz TMA-13/17S launch  
10/14/08 -- Soyuz TMA-13/17S docking (SM aft port)  
10/23/08 -- Soyuz TMA-12/16S undocking (FGB nadir)  
11/03/08 -- Soyuz TMA-13/17S relocation (from SM aft to FGB nadir)  
11/06/08 -- STS-119/Discovery/15A launch -- S6 truss segment  
11/08/08 -- STS-119/Discovery/15A docking  
11/17/08 -- STS-119/Discovery/15A undocking  
11/20/08 -- **ISS 10 Years**  
11/26/08 -- Progress M-67/32P launch  
11/28/08 -- Progress M-67/32P docking (SM aft port)

04/15/09 -- **Constellation's Ares I-X Launch**

05/??/09 -- **Six-person crew on ISS** (following Soyuz 18S-2 docking)

04/??/10 -- STS-132/Discovery/20A – Node-3 + Cupola.

Note: The daily ISS On-Orbit Status reports can also be found at

[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/28/07  
**Date:** Friday, December 28, 2007 2:13:29 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/28/07**

All ISS systems continue to function nominally, except those noted previously or below.

CDR Whitson and FE-2 Tani began the day with the daily reading of SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) experiment data accumulated during the night, for logging and filling in questionnaire entries in the experiment's session file on the HRF-1 laptop for downlink. *[To monitor the crewmembers' sleep/wake patterns and light exposure, Dan and Peggy wear a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

Upon wakeup, FE-1 Yuri Malenchenko terminated his fifth MBI-12 SONOKARD experiment session, started last night, by taking the recording device from his SONOKARD sports shirt pocket and later copying the measurements to the RSE-MED laptop for subsequent downlink to the ground. *[SONOKARD objectives are stated to (1) study the feasibility of obtaining the maximum of data through computer processing of records obtained overnight, (2) systematically record the crewmember's physiological functions during sleep, (3) study the feasibility of obtaining real-time crew health data. Investigators believe that contactless acquisition of cardiorespiratory data over the night period could serve as a basis for developing efficient criteria for evaluating and predicting adaptive capability of human body in long-duration space flight.]*

As part of his standard fitness evaluation, Malenchenko also undertook the Russian MO-5 MedOps protocol of Cardiovascular Evaluation during Graded Exercises on the VELO cycle ergometer, with CDR Whitson assisting as CMO (Crew Medical Officer). *[The 50-min assessment, supported by ground specialist tagup via VHF (~3:55am EST) and telemetry monitoring, uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph*

*cuff wired to the cycle ergometer's instrumentation panels. For the graded exercise, the subject works the pedals after a prescribed program at load settings of 125, 150, and 175 watts for three minutes each. Data output involves a kinetocardiogram, rheoplethysmogram, rheoencephalogram and a temporal pulsogram.]*

After Peggy Whitson prepared the auditory test equipment, she, Malenchenko & FE-2 Tani took the periodic (monthly) O-OHA (On-Orbit Hearing Assessment) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC (Medical Equipment Computer) laptop application. It was the second session for the three crewmembers. *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month. Note: There have been temporary hearing deficits documented on some U.S. and Russian crewmembers, all of which recovered to pre-mission levels.]*

Whitson and Tani set up and activated the OUM-PFE (Oxygen Uptake Measurement - Periodic Fitness Evaluation) equipment at the HRF-2 (Human Research Facility 2) rack for another session, requiring a CEVIS cycle ergometer workout. Both crewmembers then completed the evaluation protocol, wearing HRMs (Heart Rate Monitors), with each one in turn acting as subject and operator, obtaining measurements on each other during the workout. *[The equipment includes the HRF PFM/PAM (Pulmonary Function Module/Photoacoustic Analyzer Module), Mixing Bag System and GDS (Gas Delivery System). In a change to previous procedures, the calibration of the DPFM (Differential Pressure Flowmeter) was done manually for the first time. Later, Peggy and Dan updated the evaluation protocol, deactivated & stowed the gear, and powered down the OUM-PFE laptop. Purpose of OUM-PFE is to measure aerobic capacity during exercise within 14 days after arrival on ISS, and once monthly during routine PFEs. The data allows exercise physiologists & flight doctors to assess the crew's health & fitness and to provide data for modifying & updating crew-specific exercise regimes. PFE-OUM is a collaborative effort between NASA and ESA (European Space Agency).]*

Yuri Malenchenko worked on the Russian SOTR Thermal Control System, rerouting and connecting jumpers between the KMTK Triple Channel Matrix Commutator switch and the PUVN Cabin Air Heater Control Panel, to ensure continued thermal

control loop operation in case of loss of communication between the Terminal & Central Computers.

Later, the FE-1 performed the periodic communication check and time synchronization between the BSPN payload server and the ISS “Wiener” power laptop, using the RSC-E “PingMaster” program, used for network checkouts.

In the Lab, Dr. Whitson serviced the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment in the MSG (Microgravity Science Glovebox) by terminating the overnight vacuum draw on the SPU10 (Sample Processing Unit 11), opening the vent and vacuum valves for a six-hour vacuum draw on the work chamber, and setting up final operations tomorrow by installing SPU13 and initiating a last vacuum draw on it. *[CSLM-2 examines the kinetics of competitive particle growth within a liquid matrix. During this process, small particles shrink by losing atoms to larger particles, causing the larger particles to grow (coarsen) within a liquid lead/tin matrix. This study defined the mechanisms and rates of coarsening that govern the manufacture with metals from turbine blades to dental amalgam fillings.]*

Continuing the current round of periodic preventive maintenance of ventilation systems in the RS (Russian Segment), Dan Tani spent half an hour in the DC1 (Docking Compartment) to replace the PF1 & PF2 air filter cartridges with fresh units.

The FE-2 also filled out the regular FFQ (Food Frequency Questionnaire), his 8<sup>th</sup>, on the MEC. *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. At TsUP/Moscow, food specialists are currently preparing the Russian food “menu” for delivery by Progress M-63/28P next February. 28P will carry “bonus food” for Peggy and Yuri, plus about 15 kg of fresh food items (apples, grapefruit, oranges, lemons, garlic) in two containers.]*

Peggy connected the regular ITCS LTL (Internal Thermal Control System/Low Temperature Loop) coolant jumper to the LAB1D6 rack, to support the ground-commanded activation of the U.S. CDRA (Carbon Dioxide Removal Assembly) at ~12:30pm in support of tomorrow’s SPHERES experiment by Dan. *[The experiment’s floating “satellite” spheres use CO<sub>2</sub> gas as propellant.]*

The CDR also replaced procedures pages in Russian ODF (Operation Data File) books with new updates delivered on Progress 27P. *[Changes involve the books on SOZh Life Support, Medical Ops 1, 2 & 3, Technical Experiments, Medical*

*Experiments 1 & 2, and Progress M-62/27P Transfer Ops.]*

Peggy and Dan had almost four hours set aside between them to finish unloading the 27P resupply ship, transferring its cargo to the ISS and updating the IMS (Inventory Management System) accordingly.

Yuri completed of the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module). *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Later, Malenchenko also conducted the daily 20-min. IMS maintenance, updating/editing its standard "delta file" including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The CDR performed the daily status check on the BCAT-3 (Binary Colloidal Alloy Test-3) science payload, running by itself in Node-2 since 12/13 (briefly interrupted for EVA-13 photo support). The status check, conducted on the last image taken by the DCS 760 digital still camera which is controlled by EarthKAM software on an A31p laptop, is to verify proper image focus and camera alignment. *[The SSC (Station Support Computer) is taking photography of the phase separation occurring in the BCAT Sample 3, with the photo flash going off every half hour.]*

The crew worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR/OUM, FE-2/OUM), TVIS treadmill (FE-1), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1/MO-5).

Afterwards, Tani copied the exercise data file to the MEC laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

For the thruster test firing later tonight, the CDR verified proper closure of the protective shutters on the Lab science window, to remain closed until two orbits after returning to US Momentum Management control.

At ~3:25am EST, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~4:30am, Yuri linked up with TsUP stowage specialists via S-band to conduct the weekly IMS tagup, discussing stowage issues and equipment locations.

At ~2:55pm, the crew is scheduled for their seventh weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio. *[S/G-2 (Space-to-Ground 2) phone patch via SSC-10 (Station Support Computer 10)].*

At ~3:40pm, Dan Tani will have a PFC (Private Family Conference), via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-10 laptop).

*27P Dynamic Thruster Testing:* To verify proper integration of the Progress 27P cargo ship's propulsion system (used for reboosts & debris avoidance maneuvers) into the RS MCS (Motion Control System), Russian ground controllers will conduct the standard firing tests of the Progress DPO (Approach & Attitude Control) thrusters later tonight, at 7:05pm (Manifold 1) with three firings of 10 sec duration each, and at 8:41pm (Manifold 2) for a second set of three 10-sec firings. ISS attitude control will be handed over to the RS MCS at 6:20pm and returned to USOS (US Segment) CMG Momentum Management at 9:10pm.

*GNC MDM Software Patch Update:* An attempt yesterday by ground controllers at MCC-Houston to upload a software patch to the GNC MDMs (Guidance, Navigation & Control Multiplexer/Demultiplexers) was unsuccessful when the backup & prime GNC MDMs could not be synchronized. This morning, the backup MDM was returned to its nominal (pre-patch) configuration by reloading its original software without the patch. Engineers are assessing when to reattempt the patch load. Activation of the software patch, designed to allow for limiting CMG (Control Moment Gyroscope) gimbal rate acceleration to help protect the CMGs, is not planned until after Flight 1E.

*Russian SKV Air Conditioner Update:* Yesterday the FE-1 removed the NOK-2 condensate evacuation pump that pulls condensate from the SKV-2 air conditioner. Finding a "rubbery, jelly-like" substance inside the inlet line, Yuri removed as much of it as he could, and TsUP specialists directed him to clean the remainder of the line in an upcoming maintenance session. The FE-1 temporarily installed the replacement NOK-2 and will permanently install it once condensate & inlet line cleaning is complete. *[These activities are in support of SKV-2 troubleshooting that began after SKV-2 and the SRVK condensate processing unit in the RS shut down on 12/23 (last Sunday). SRVK and SKV-2 both remain operational, but are currently deactivated. SKV-1 has been inoperable for some time.]*

CEO photo targets uplinked for today again were **Yangtze River Delta** (*patchy overcast, so the crew may have seen some or all of this very large river delta at*

*nadir and right), **Shanghai, China** (patchy overcast, so the crew may have been able to see some or all of this city at nadir and right), **Polar Mesospheric Clouds — PMC, Antarctica**, (looking right), **Lahore, Pakistan** (Lahore is on the short list of Asian cities for research. The crew was to shoot city margins on this nadir pass), **Delhi, India** (looking right for this large city, which can be difficult to detect, on the banks of the large Yamuna River, which is the main visual cue from ISS), **Santorini volcanic complex, Mediterranean** (scattered cloud forecast. The crew should have seen some of the islands in this group, well left of track), and **South Tibesti Megafans, Chad** (looking right for a general view of a wide plain covered with darker lines [immediately at the foot of the dark rocks of the Tibesti Mountains]. The dark lines are river courses of an ancient megafan [inland delta] created when the Sahara was much wetter several thousand years ago. New research shows that many features of this pattern are replicated by river-like features seen on Mars. ISS/CEO imagery is far more detailed than anything available of this remote region of the Sahara).*

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:42am EST [= epoch]):

Mean altitude -- 335.7 km

Apogee height -- 336.9 km

Perigee height -- 334.5 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0001723

Solar Beta Angle -- -74.6 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 24 hours -- 66 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 52144

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

*NET = Not Earlier Than):*

12/28/07 – Thruster Test Firing (~7:05pm)

TBD -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.

TBD -- STS-122/Atlantis/1E docking

TBD -- STS-122/Atlantis/1E undocking

01/31/08 -- **Explorer-1 50 Years (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it

out at <http://usspace50.com>

02/06/08 -- Progress M-62/27P undocking & reentry  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking (DC1)  
02/22/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/06/08 -- ATV-1 Demo Day 1  
03/12/08 -- ATV-1 Demo Day 2  
03/15/08 -- ATV-1 Demo Day 3 & Docking (SM aft port)  
04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
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05/16/08 -- Progress M-64/29P docking (DC1)  
08/07/08 -- NET: ATV-1 undocking (from SM aft port)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/09/08 -- Progress M-64/29P undocking (from DC1)  
09/10/08 -- Progress M-66/31P launch  
09/12/08 -- Progress M-66/31P docking (DC1)  
09/18/08 -- STS-126/Discovery/ULF2 launch – MPLM Leonardo, LMC  
09/20/08 -- STS-126/Discovery/ULF2 docking  
10/01/08 -- STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **NASA 50 Years**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
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11/26/08 -- Progress M-67/32P launch

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05/??/09 -- **Six-person crew on ISS** (following Soyuz 18S-2 docking)  
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[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/27/07  
**Date:** Thursday, December 27, 2007 1:03:25 PM  
**Attachments:**

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### **ISS On-Orbit Status 12/27/07**

All ISS systems continue to function nominally, except those noted previously or below.

CDR Whitson and FE-2 Tani started the day with their daily reading of SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) data accumulated during the night, for logging and filling in questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for downlink. *[To monitor the crewmembers' sleep/wake patterns and light exposure, Dan and Peggy wear a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

Also upon wake-up, FE-2 Tani started Part 3 (of 5) of the periodic acoustic measurement protocol by recording post-sleep data of the crew-worn acoustic dosimeters, later deploying the dosimeters statically in the Service Module (SM) (Panel 404 near SM air conditioner, SM Central Post, & Vozdukh) for the duration of the day, then recording measurements this afternoon (~4:10pm EST) and stowing the instruments (Parts 4 & 5). *[Acoustic data must be taken twice per Increment, each time for the duration of the 16-hour crew workday.]*

Before breakfast & first exercise, Whitson, Malenchenko and Tani completed a full session with the Russian crew health monitoring program's medical assessment MO-9/Biochemical Urinalysis. Afterwards, the FE-1 closed out and stowed the Urolux hardware. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

At ~5:30am, the FE-2 again activated the VDS MPC (Video Distribution System/ Multi-Purpose Converter) with its four downlinks to allow the ground to conduct HDTV (high-definition TV) playback and downlink operations. Later (~12:30pm), the MPC was powered off again.

In the Lab, after inspecting, activating and configuring the MSG (Microgravity Science Glovebox) facility, Dr. Whitson initiated another series of vacuum draws on the sample chamber containing SPU-10 (Sample Processing Unit #10), by opening the vent and vacuum valves, for subsequent CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment ops tomorrow and the exchange with SPU-13 on 12/29. *[CSLM-2 examines the kinetics of competitive particle growth within a liquid matrix. During this process, small particles shrink by losing atoms to larger particles, causing the larger particles to grow (coarsen) within a liquid lead/tin matrix. This study defined the mechanisms and rates of coarsening that govern the manufacture with metals from turbine blades to dental amalgam fillings.]*

Later, the CDR broke out and set up the PFE-OUM (PFE-Oxygen Uptake Measurement) equipment on the HRF-2 (Human Research Facility 2) rack, including the HRF PFM/PAM (Pulmonary Function Module/Photoacoustic Analyzer Module), Mixing Bag System and GDS (Gas Delivery System). Data collection on herself and Dan, taking turns, is scheduled tomorrow. *[The Periodic Fitness Evaluation with Oxygen Uptake Measurement experiment, using the CEVIS ergometer for workout, demonstrates the capability of crewmembers to perform periodic fitness evaluations with continuous oxygen consumption measurements within 14 days after arrival on ISS, and once monthly during routine PFEs. Once the capability of the pulmonary function system (PFS) to perform PFEs is verified, crewmembers will be able to integrate their monthly PFE with oxygen consumption measurements to fulfill the requirement for cardiovascular fitness evaluations during long-duration space flight.]*

Working in the newly arrived 27P cargo ship (TKG), the FE-1 installed the LKT local temperature sensor commutator (TA251MB) of the BITS2-12 onboard telemetry measurement system, along with its ROM unit (read-only memory, TA765B), a 1-hr. job. The LKT was subsequently switched on by the ground to complete the basic configuration.

Yuri completed the electronic integration of 27P into the ISS by installing the standard US-21 matching unit, another 1-hr. task. A dynamic thruster test of the installation is scheduled tomorrow evening (7:05pm-8:41pm EST). *[The US-21 matching unit connects the SM with the Progress motion control and DPO thrusters systems, so that they can be commanded by the SM computer system (BVS). After bolting the box down, Yuri hooked up its the telemetry (TM) connector to the BITS2-*

*12 onboard TM system on Go from TsUP, after Moscow had inhibited data output to the VD-SU control system mode, powered off the BITS and deactivated the Elektron and the SKV-1 air conditioner. These systems were subsequently turned back on. ]*

The CDR and FE-2 had almost two hours scheduled between them to unload the 27P resupply ship, transfer its cargo to the ISS and update the IMS accordingly.

Using the SKDS CMS (Pressure Control & Atmosphere Monitoring System/ Countermeasure System), the FE-1 took the periodic readings of potentially harmful contaminants in the SM. The hardware was then returned to initial stowage. *[The CMS uses preprogrammed microchips to measure Formaldehyde (H<sub>2</sub>CO, methanal), Carbon Monoxide (CO) and Ammonia (NH<sub>3</sub>), taking one measurement per microchip.]*

The CDR conducted the daily status check on the BCAT-3 (Binary Colloidal Alloy Test-3) science payload, running by itself in Node-2 since 12/13 (briefly interrupted for EVA-13 photo support). The status check, conducted on the last image taken by the DCS 760 digital still camera which is controlled by EarthKAM software on an A31p laptop, is to verify proper image focus and camera alignment. *[The SSC (Station Support Computer) is taking photography of the phase separation occurring in the BCAT Sample 3, with the photo flash going off every half hour.]*

Peggy also removed the equipment used yesterday for downlinking TV imagery of the Progress docking via Ku-band and disconnected the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable at the Lab RWS (Robotics Work Station) which was required for video coverage of the docking from the SSRMS (Space Station Remote Manipulator System) cameras.

Dan Tani booted up the ER2 RIC (EXPRESS Rack 2/Rack Interface Controller) laptop, then installed a new software load (Release 5) on it in two parts.

Performing the periodic (generally monthly) service of the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), the FE-1 removed the PCMCIA memory card #940 from the AST spectrometer's slot and copied the accumulated data, also from a previous card, #937, to the RSK1 laptop for subsequent downlinking via OCA. PCMCIA card 941 was then inserted to continue AST ops.

Peggy conducted the periodic (monthly) CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout, today on all four units, then picked a new prime instrument and returned the backup units & sampling pump to their

original locations. *[The CSA-CP is a passive cabin atmosphere monitor that provides quick response capability during a combustion event (fire). Its collected data are stored on a logger. Peggy changed out the batteries on the units, then zero-calibrated the instruments (to eliminate drift in the combustion sensors).*

*Following zero calibration, the backup units was stowed in the Node (next to the sampling pump), while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

The CDR also took air samples for the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-CP (Compound Specific Analyzer-Combustion Products), CSA-O<sub>2</sub> (CSA -Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[Purpose of the 15-min activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements.]*

Peggy Whitson conducted the weekly 10-min. CWC audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water callowns are sent up every other week. The current cue card (16-0018K), to be updated with today's data, lists 26 CWCs; ~983 liters total) for the four types of water identified on board: technical water (735.4 l, for Elektron, flushing, hygiene), potable water (221.3 l), condensate water (0 l), waste/EMU dump and other (26.6 l). Two CWCs (#1004 & #1081, ~89 l) with potable water are off limits due to the Wautersia bacteria found in sample analysis, the source of which is still not understood. Impact of losing this potable CWC is negligible since there are sufficient drinking water supplies onboard. Also currently not to be used are nine CWCs with technical water (~389 l).]*

In the SM, Dan set up the video equipment for filming the subsequent workouts of all three crewmembers on the TVIS (Treadmill with Vibration Isolation & Stabilization), for biomechanical evaluation and assessment of the hardware status by ground engineers. Afterwards, he transferred the footage to VTR (Video Tape Recorder) for subsequent downlink to the ground, then dismantled and stowed the video equipment. *[Preparations included the removal of the treadmill's "skirt" to show TVIS motion within the floor "pit" in the SM along with the crewmember's feet striking the belt.]*

The crew conducted their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Whitson copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Yuri took care of the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Later, Malenchenko also completed the daily 20-min. IMS (Inventory Management System) maintenance, updating/editing its standard "delta file" including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

At ~5:02am, the FE-1 powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), to conduct, at 5:07am, a ham radio exchange with students at High School No. 15 in the city of Korolev near Moscow (home of RSC-Energia, TsNIIMASh, and TsUP). Questions to the crew were uplinked beforehand. *["What contaminations, and where, do you see in the ocean, on land and in the atmosphere?"; "What do US astronauts do onboard ISS as part of the school educational program?"; "How did you celebrate Christmas and how are you going to celebrate the New Year?"; "What presents did you get for the holidays with the arrival of the cargo vehicle?"; "We wish you a happy flight, interesting experiments, effective educational programs, and, of course, a soft landing. Happy New Year to all of you!"]*

At ~10:15am, the crew conducted a press conference with Moscow's TV Channel Russia Today, speaking from the SM decked out with New Year decorations and wearing "Father Frost" caps. *[Russia Today is the first English-language news channel to present the Russian point of view on events happening in Russia and around the globe, on the air 24/7 with a potential of millions of viewers via 10 satellites and also 24 hours a day on the Internet. "How many times can you celebrate the New Year on orbit? How many times will your clock strike 12? What is this related to? How many times are you going to celebrate?"; "Is this going to be your first New Year in space? What are your feelings and thoughts in connection with that? Do you feel excited, committed?"; "Do cosmonauts have their own traditions when they celebrate?"; "How did you prepare for the New Year? "Who takes care of that? How was all of this delivered there?"; "How about the New Year traditions? How do you drink champagne? And, generally*

*speaking, how do you do orbital celebrations?"; "On the New Year, do you feel some special nostalgia? What earthly fun will you be missing on this New Year night?"; "Are weekends any different from work days in space? What do you do? What kind of entertainment do you have?"; "Do you have a New Year wish? If wished on orbit is it going to come true sooner?"; "What kind of present would you like to get this New Year?"; "When you get back to Earth are you going to celebrate the New Year all over again with your families?"]*

At ~1:05pm, the crew conducted their standard weekly teleconference with the JSC Astronaut Office (Kent Rominger), via Private S-band S/G-2 (space-to-ground).

At ~2:00pm, Dan Tani has a PFC (Private Family Conference) scheduled, via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-10 laptop).

CEO photo targets uplinked for today again were **Urumqi, China** (*looking right at the foot of the Tien Shan range for China's western oil boom city*), **Eastern Tien Shan Range** (*ISS passed over one of central Asia's ice capped ranges. Shooting white ice caps and glacier tongues at nadir and left. Ice caps are being drilled for cores that reveal information on climate change, and particularly because of the information they store on past environments--often tens of thousands of years of data on snow fall amount, blowing dust deposition as an indication of dryness, and atmospheric composition from air bubbles in the ice. This kind of data is being lost in many cases due to rapid melting. Continental ice caps in interior Asia have received far less attention than other low-latitude ice caps*), **Florida Coastal Everglades** (*50% cloud cover predicted, so there is a chance the crew may see some or all of the target: looking right to obtain a mapping swath*), and **Tunis, Tunisia** (*looking nadir and a touch right at the head of the big bay. Only scattered cloud predicted*).

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/26/07  
**Date:** Wednesday, December 26, 2007 1:20:31 PM  
**Attachments:**

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## ISS On-Orbit Status 12/26/07

All ISS systems continue to function nominally, except those noted previously or below.

**Yest kasaniye!** Progress M-62 (27P), approaching from below the station, docked nominally at the DC1 Docking Compartment nadir port at 3:14am EST, with automatic AO-VKA orientation antenna retraction, followed by docking probe retraction and hook closure ("sboroka") at 3:23am after motion damp-out, while the ISS was in free drift. *[Launched 12/23 (2:12am EST), the 27P resupply drone delivered about 2.5 tons of cargo for the ISS crews, including propellants for the Russian thrusters, fresh water, oxygen, food, spare parts, repair gear, life support and science experiment hardware. For the docking, ISS attitude control authority was handed over to Russian MCS (Motion Control System) thrusters at 11:48pm and returned to US Momentum Management at 5:06am. Starting with TV camera activation at ~2:37am (range ~8 km), the KURS TV camera display data overlay failed to show through docking despite attempts by the crew to activate the numerical display. The docking took place nominally, without violation of any joint flight rules, since Malenchenko and Whitson had all numerical data on a laptop before them. Telemetry was also available in TsUP-Moscow.]*

In preparation for the docking, FE-2 Dan Tani set up the IWIS (Internal Wireless Instrumentation System) equipment for measuring structural dynamics disturbances (accelerations/vibrations) during docking. *[RSUs (Remote Sensing Units) were connected to power outlets in Lab, Node-1, SM (Service Module) and FGB, with data transmitted to the Lab NCU (Network Control Unit) from the RS via cable, not wireless (due to previous experience with lack of RF signal strength). Later, the IWIS was powered down and the RS units removed and stowed.]*

Earlier today, FE-1 Malenchenko and CDR Whitson had completed final preparations for Progress arrival, including turning off amateur (ham) radio equipment in the ISS to prevent any interference with Progress/KURS radio traffic, and activation of the SSC6 (Station Support Computer 6) A31p laptop in the

FGB for handling the video transmission from the Russian segment (RS) via the Ku-band assets in the USOS. *[The A31p used for the routing from the SM is located in the FGB since available cables are not long enough to extend to the Node. The video signal is fed from there via coaxial cable to the SSC Operations LAN (local area network) and from there into the Ku-band system for subsequent conversion from the Russian SECAM format to the American NTSC format on the ground. The newly set up VSW (Video Streaming Workstation) failed to convert and/or downlink analog video of the docking to MCC-Houston and thence to TsUP-Moscow. A second video stream, a digital MPEG (Moving Pictures Expert Group 2) transmission originating in the RS by the Russian/ESA encoder, passed without problem via the ISS JSL (Joint Station LAN) through Ku-band to both MCCs.]*

Malenchenko and Whitson then monitored the docking process from the TORU (teleoperated approach & docking system) station in the SM, in "hot standby" mode, and took photography of the Progress approach and linkup.

After the docking, the FE-1 shut off TORU and began reconfiguring the STTS telephone/telegraph subsystem to normal ops. *[The "Voskhod-M" STTS enables telephone communications between the SM, FGB, DC1 and U.S. segment (USOS), and also with users on the ground over VHF channels selected by an operator at an SM comm panel, via STTS antennas on the SM's outside. There are six comm panels in the SM with pushbuttons for accessing any of three audio channels, plus an intercom channel. Other modes of the STTS include telegraphy (teletype), EVA voice, emergency alarms, Packet/Email, and TORU docking support.]*

The crew then conducted the standard one-hour leak checks of the docking vestibule and fuel/oxidizer transfer line interface between Progress and DC1. During leak checking and initial clamp installation, Russian thrusters were inhibited (as they were during docking).

After opening the two hatches, Yuri and Peggy first installed the QD (quick disconnect) screw clamps (BZV) of the docking & internal transfer mechanism (SSVP) to rigidize the coupling, and the FE-1 removed the PkhO/DC1 (SU) hatch cover, reinstalled the IP-1 airflow sensor and assembled the ventilation/heating air duct.

Next, Malenchenko performed the standard air sampling inside the Progress with the Russian AK-1M air sampler, then deactivated the cargo ship. At the same time, the CDR also collected samples with a GSC (Grab Sample Container) at the center of 27P.

Peggy and Yuri then began Progress unloading and cargo transfer to the ISS, accompanied by IMS (Inventory Management System) logging. Malenchenko's first priority for the transfer was the new Japanese (JAXA) 3DPC-J (3D Photon Crystals) experiment, which Yuri set up in the SM. *[3DPC hardware had been removed by Valery Tokarev on 3/23/06 as part of closing out JAXA's 3D-PCGF Growth Facility and was inadvertently returned to Earth. 3DPC studies the production of 3D photonic crystals, from UV LEDs, through self-organization and ordering of colloid nanoparticles in an electrolyte solution with subsequent fixation in an elastic gel matrix.]*

CDR Whitson and FE-2 Tani had started the day with their daily reading of the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) data accumulated during the night, for logging and filling in questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for downlink. *[To monitor the crewmembers' sleep/wake patterns and light exposure, Dan and Peggy wear a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

The FE-2 conducted his daily status check on the BCAT-3 (Binary Colloidal Alloy Test-3) science payload, running by itself in Node-2 since 12/13 (briefly interrupted for EVA-13 photo support). The status check, conducted on the last image taken by the DCS 760 digital still camera which is controlled by EarthKAM software on an A31p laptop, is to verify proper image focus and camera alignment. *[The SSC (Station Support Computer) is taking photography of the phase separation occurring in the BCAT Sample 3, with the photo flash going off every half hour.]*

Dan Tani performed the periodic offloading of the Lab CCAA (Common Cabin Air Assembly) dehumidifier's condensate tank, filling CWC (Contingency Water Container) #1062 with the collected water slated for processing, and putting aside two water samples in bags (1 sample bag, 1 purge bag) for return to Earth. *[Estimated offload time before termination (leaving ~6 kg in the tank): ~40 min. Dan*  
*There is currently continued attention on water sampling after the discovery of some contaminated CWCs. The identified contaminant, a common soil bacterium (unicellular organism) called Wautersia after Belgian microbiologist Georges Wauters, is no more critical than what is found often in faucet water on the ground or in farm soil. Wautersia lives off hydrogen & carbon dioxide, oxidizing H<sub>2</sub> and producing gaseous oxyhydrogen as energy for itself. Since it can turn sugar into a synthetic biodegradable fuel, it was seen for a short while as a promising long-term solution to the petroleum dependency, until it became clear that this "solution" would require gigantic amounts of expensive sugar.]*

Dan Tani worked on the RED (Resistive Exercise Device), replacing two canister pulley cables (done after every 53,515 cycles, based on life cycle testing results & safety controls), afterwards concluding with the standard Flexpac canister load calibration as required after cable replacements. (Last time done: 11/1). *[In addition to the cords, the FE-2 also replaced the aft (right canister's) spiral pulley and a few of the bottom cover fasteners. Cables are replaced periodically after ground analysis shows cable life has expired. Dan's on-orbit calibration of the Schwinn RED cans re-established the relationship of specific load settings with a specific number of pulls per setting, followed by recording of the load values measured with a calibration tool and steel handles from the on-orbit calibration kit.]*

The crewmembers completed their regular 2.5-hr physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill with vibration isolation (CDR, FE-1), and RED (CDR, FE-2).

Afterwards, Tani copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Yuri took care of the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Peggy Whitson readied the PZE MO-9 equipment for another Russian "Urolux" biochemical urine testing, scheduled tomorrow for all three crewmembers. *[MO-9 is conducted regularly every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for US crewmembers for IMG (Integrated Medical Group) PHS evaluation as part of the "PFE w/o Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. The data are then entered in the Medical Equipment Computer (MEC)'s special IFEP (In-Flight Examination Program) software.]*

Later today, before sleep time, Dan Tani will ready the equipment for the periodic acoustic measurement protocol by deploying crew-worn acoustic dosimeters to the station residents, to be carried overnight with a microphone on the shirt collar. (Last time done: 9/11). *[Tomorrow, after about 15 hours of measurements, dosimeter data will be downloaded and the hardware power-cycled for another data take. At*

*that point, the crew will deploy the dosimeters statically in the station for the duration of the day, record measurements tomorrow noon and stow the instruments. Acoustic data must be taken twice per Increment, each time for the duration of the 16-hour crew workday.]*

The FE-2 has two PFCs (Private Family Conference) scheduled, via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-10 laptop), one with Clay Anderson at ~1:20pm , the other with his family at ~2:55pm.

*Weekend Voluntary Science:* For the voluntary “Saturday Science” program on 12/29, Dan was offered, for his acceptance, a session with the SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites) experiment, flying two & three satellites and testing various deployment conditions aimed at operations improvement.

CEO photo targets uplinked for today again were **Polar Mesospheric Clouds** (PMC — also known as noctilucent clouds) over selected ground sites (12 minutes for each). Also suggested for Dan Tani were a series of night photographs of city lights. *(Use of the footprint of city lights as a proxy for population size and density [in different cultures/economies] is proving out as a workable method of observing population change through time).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:57am EST [= epoch]):

Mean altitude -- 336.0 km

Apogee height -- 336.8 km

Perigee height -- 335.1 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0001257

Solar Beta Angle -- -73.1 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 24 hours -- 82 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 52112

**Significant Events Ahead** (all dates Eastern Standard, some changes possible).

*NET = Not Earlier Than):*

- 12/30/07 -- ISS Reboost (phasing)
- 01/10/08 -- NET: STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.
- 01/12/08 -- NET: STS-122/Atlantis/1E docking
- 01/21/08 -- NET: STS-122/Atlantis/1E undocking
- 01/31/08 -- **Explorer-1 50 Years (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com>]
- 02/06/08 -- Progress M-62/27P undocking & reentry
- 02/07/08 -- Progress M-63/28P launch
- 02/09/08 -- Progress M-63/28P docking (DC1)
- 02/22/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)
- 02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS
- 02/16/08 -- STS-123/Endeavour/1J/A docking
- 02/27/08 -- STS-123/Endeavour undocking
- 02/29/08 -- STS-123/Endeavour landing
- 03/06/08 -- ATV-1 Demo Day 1
- 03/12/08 -- ATV-1 Demo Day 2
- 03/15/08 -- ATV-1 Demo Day 3 & Docking (SM aft port)
- 04/07/08 -- Progress M-63/28P undocking (DC1) & reentry
- 04/08/08 -- Soyuz TMA-12/16S launch
- 04/10/08 -- Soyuz TMA-12/16S docking (DC1)
- 04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)
- 04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)
- 04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS
- 04/26/08 -- STS-124/Discovery/1J docking
- 05/04/08 -- STS-124/Discovery/1J undocking
- 05/14/08 -- Progress M-64/29P launch
- 05/16/08 -- Progress M-64/29P docking (DC1)
- 08/07/08 -- NET: ATV-1 undocking (from SM aft port)
- 08/12/08 -- Progress M-65/30P launch
- 08/14/08 -- Progress M-65/30P docking (SM aft port)
- 09/09/08 -- Progress M-64/29P undocking (from DC1)
- 09/10/08 -- Progress M-66/31P launch
- 09/12/08 -- Progress M-66/31P docking (DC1)
- 09/18/08 -- STS-126/Discovery/ULF2 launch – MPLM Leonardo, LMC
- 09/20/08 -- STS-126/Discovery/ULF2 docking
- 10/01/08 -- STS-126/Discovery/ULF2 undocking.
- 10/01/08 -- **NASA 50 Years**
- 10/11/08 -- Progress M-65/30P undocking (from SM aft port)
- 10/12/08 -- Soyuz TMA-13/17S launch
- 10/14/08 -- Soyuz TMA-13/17S docking (SM aft port)

10/23/08 -- Soyuz TMA-12/16S undocking (FGB nadir)  
11/03/08 -- Soyuz TMA-13/17S relocation (from SM aft to FGB nadir)  
11/06/08 -- STS-119/Discovery/15A launch – S6 truss segment  
11/08/08 -- STS-119/Discovery/15A docking  
11/17/08 -- STS-119/Discovery/15A undocking  
11/20/08 -- **ISS 10 Years**  
11/26/08 -- Progress M-67/32P launch  
11/28/08 -- Progress M-67/32P docking (SM aft port)  
04/15/09 -- **Constellation's Ares I-X Launch**  
05/??/09 -- **Six-person crew on ISS** (following Soyuz 18S-2 docking)  
04/??/10 -- STS-132/Discovery/20A – Node-3 + Cupola.

Note: The daily ISS On-Orbit Status reports can also be found at  
[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/25/07  
**Date:** Tuesday, December 25, 2007 1:52:21 PM  
**Attachments:**

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## ISS On-Orbit Status 12/25/07

All ISS systems continue to function nominally, except those noted previously or below. *Off-duty day for the crew.*

***Merry Christmas!***

**Progress M-62/27P is continuing its 3-day** flight to the ISS for docking tomorrow morning (12/26) at ~3:25am EST at the DC1 nadir port. All onboard tests (TV, KURS, TORU) and the DV3 burn on Orbit 33, during RGS (Russian ground site) passes were nominal. ***(See Timeline, below).***

Before breakfast, FE-2 Dan Tani and CDR Peggy Whitson completed their daily access of the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging and filling in questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for downlink. *[To monitor the crewmembers' sleep/wake patterns and light exposure, Dan and Peggy wear a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

FE-1 Malenchenko serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The regen process will be terminated at ~2:45pm EST. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods. Filter bed 1 was regenerated yesterday.]*

Yuri also performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U*

*urine containers.]*

The crewmembers completed their regular 2.5-hr physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill with vibration isolation (CDR, FE-1), RED resistive exercise device (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Peggy copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~1:00pm, Dan Tani had a PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-10 laptop).

At ~11:30am, CDT Whitson conducted a teleconference with the Houston Flight Control Team (FCT).

*ASN-M Testing:* TsUP-Moscow began with tests of the ASN-M Satellite Navigation System over six orbits, without crew involvement. *[ASN-M is required for ATV (Automated Transfer Vehicle) “Jules Verne” prox ops next year.]*

***Timeline for 27P Approach & Docking (all times EST):***

- ISS mnvr to dock attitude: 12:50am – 1:40am (-XVV –YLV)
- Range = 9km - VHF activation/TORU command link: 2:36am
- Range = 8km – Progress TV activation: 2:37am
- Flyaround mode start: 2:54am
- Stationkeeping start: 3:03am
- RGS AOS: 3:15am
- Final Approach start: 3:17am
- 27P Docking at DC1 nadir port: 3:25am
- RGS LOS: 3:37am
- Progress hooks closed: 3:46am

CEO photo targets uplinked for today again were **Polar Mesospheric Clouds** (PMC — also known as noctilucent clouds) over selected ground sites (12 minutes for each). Also suggested for Dan Tani were a series of night photographs of city lights. *(Use of the footprint of city lights as a proxy for population size and density [in different cultures/economies] is proving out as a workable method of observing population change through time).*

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 9:13am EST [= epoch]):

Mean altitude -- 336.0 km  
Apogee height -- 336.7 km  
Perigee height -- 335.4 km  
Period -- 91.25 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0000965  
Solar Beta Angle -- -70.2 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in the last 24 hours -- 16 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 52097

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

NET = Not Earlier Than):

12/26/07 -- Progress M-62/27P docking (DC1); ~3:25am  
12/30/07 -- ISS Reboost (phasing)  
01/10/08 -- NET: STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.  
01/12/08 -- NET: STS-122/Atlantis/1E docking  
01/21/08 -- NET: STS-122/Atlantis/1E undocking  
01/31/08 -- **Explorer-1 50 Years (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [*Check it out at <http://usspace50.com>*]  
02/06/08 -- Progress M-62/27P undocking & reentry  
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03/12/08 -- ATV-1 Demo Day 2  
03/15/08 -- ATV-1 Demo Day 3 & Docking (SM aft port)  
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04/08/08 -- Soyuz TMA-12/16S launch

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05/14/08 -- Progress M-64/29P launch  
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09/20/08 -- STS-126/Discovery/ULF2 docking  
10/01/08 -- STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **NASA 50 Years**  
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11/26/08 -- Progress M-67/32P launch  
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[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/24/07  
**Date:** Monday, December 24, 2007 1:48:44 PM  
**Attachments:** [image001.gif](#)

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## ISS On-Orbit Status 12/24/07

All ISS systems continue to function nominally, except those noted previously or below.  
*Underway: Week 10 of Increment 16. **Merry Christmas and Great Holidays to everyone!***

**Progress M-62/27P is continuing its 3-day** flight to the ISS for docking Wednesday morning (12/26) at ~3:25am EST at the DC1 nadir port. All onboard tests (TV, KURS, TORU), performed today during RGS (Russian ground site) passes, were without issues. *(See picture below).*

Before breakfast, FE-2 Dan Tani and CDR Peggy Whitson completed their daily access of the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging and filling in questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for downlink. *[To monitor the crewmembers' sleep/wake patterns and light exposure, Dan and Peggy wear a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

FE-1 performed troubleshooting on one (A1) of the two redundant BSV-M (Frequency & Time Synchronization System, i.e., Master Clock) units in the Service Module (SM). *[After a software update on the Russian BSPN payload server on 11/8, ground analysis of the BSPN log file on 11/12 discovered a failure of channel 2 of the BSPN CAN interface. Since BSV-M A1 is needed for nominal operation with the payload server, Malenchenko today switched connections of CAN channel 1 to BSV-M A2 before a new BSV-MA1 unit is delivered next February on Progress 28P.]*

Later, Malenchenko performed the periodic communication check and time synchronization between the BSPN payload server and the ISS "Wiener" power laptop, using the RSC-E "PingMaster" program, used for network checkouts.

Yuri also serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #1 of the regenerable dual-channel filtration system. The regen process will be terminated before sleeptime, at ~4:15pm EST.

Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

CDR Whitson conducted the third and final session of the LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)/Phase 2 operations, sampling four of the sites that were identified in the CHeCS SSK (Crew Health Care Systems/Surface Sampler Kit) procedure also scheduled for today. *[The goal is to compare LOCAD results with the SSK colony growth results. LOCAD uses small, thumb-sized "microfluidic" cartridges that are read by the experiment reader. The cartridges contain dried extract of horseshoe crab blood cells and colorless dye. In the presence of the bacteria, the dried extract reacts strongly to turn the dye a green color. Therefore, the more green dye, the more microorganisms there are in the original sample. The handheld device tests this new analysis technology by sampling for the presence of gram negative bacteria in the sample in about 15 minutes, showing the results on a display screen. Background: Lab-on-a-Chip technology has an ever-expanding range of applications in the biotech industry. Chips are available (or in development) which can also detect yeast, mold, and gram positive bacteria, identify environmental contaminants, and perform quick health diagnostics in medical clinics. The technology has been used to swab the MERs (Mars Exploration Rovers) for planetary protection. With expanded testing on ISS, began by Sunita Williams in March/April this year, this compact technology has broad potential applications in space exploration--from monitoring environmental conditions to monitoring crew health. The current study should prepare for long-duration exploration by demonstrating a system that enables the crew to perform biochemical analysis in space without having to return samples to Earth.]*

During Peggy's LOCAD activities, FE-2 Tani collected SSK microbiological surface samples at specific locations near air diffusers and later also sampled the cabin atmosphere by collecting air samples with the MAS (Microbial Air Sampler) kit at mid-module. *[Bacterial and fungal air samples are usually taken at two locations in the module being checked. The colony growth on the MAS sampling slides is analyzed after five days of incubation in four Petri dishes. For onboard visual analysis of media slides from SSK (Surface Sampling Kit), the crew has a procedure for visual inspection of samples for bacterial and fungal colony growths after appropriate incubation periods.]*

Whitson and Malenchenko each performed the CHeCS CMO (Crew Medical Officer) on-board training drill, a (generally) monthly 30-min. video & audio refresher course, taken individually, to hone the CMO's acuity in emergency medical operations. *[The proficiency drill focuses on re-familiarization with skills and techniques required in procedures related to medical issues arising on board and concludes with a self-assessment questionnaire. The HMS (Health Maintenance Systems) hardware, which includes ACLS (Advanced Cardio Life Support) equipment, may be used in contingency situations where crew life is at risk. To maintain proficiency, crewmembers spend one hour per month reviewing HMS and ACLS equipment and procedures via the HMS CBT (computer-based training) and the ACLS CBT.]*

Yuri and Peggy also conducted a one-hour refresher teleconference on the upcoming

Progress 27P docking using the TORU manual backup control system in the event of a failure of the automated KURS system.

Dan Tani performed his daily status check on the BCAT-3 (Binary Colloidal Alloy Test-3) science payload, running by itself in Node-2 since 12/13 (briefly interrupted for EVA-13 photo support). The status check, conducted on the last image taken by the DCS 760 digital still camera which is controlled by EarthKAM software on an A31p laptop, is to verify proper image focus and camera alignment. *[The SSC (Station Support Computer) is taking photography of the phase separation occurring in the BCAT Sample 3, with the photo flash going off every half hour.]*

Working on the SM's SOZh (Environment Control & Life Support System) plumbing system, the FE-1 removed & replaced the life-expired gas-liquid mixture filter (FGS) in the powered-down condensate water processor (SRVK-2M), discarding the old unit.

Starting a new round of periodic preventive maintenance of RS (Russian Segment) ventilation systems, the FE-2 worked in the FGB (Funktsionalnyi-Grusovoi Blok) to clean the vent screens of specific interior closeout panels (116, 231, 316 & 431), then moved on to do the detachable VT7 fan screens 1, 2 & 3 of the three SOTR (Thermal Control System) gas-liquid heat exchangers (GZhT4) and finished by cleaning the TsV1 fan grille.

FE-1 Malenchenko unstowed and set up the electric equipment for the upcoming operation of the new Russian/Japanese (JAXA) experiment 3DPC-J (3D Photon Crystals), with its main unit to be delivered on 27P. The experiment is scheduled for 12/26. *[3DPC hardware was removed by Valery Tokarev on 3/23/06 as part of closing out JAXA's 3D-PCGF Growth Facility and was inadvertently returned to Earth. 3DPC studies the production of 3D photonic crystals, from UV LEDs, through self-organization and ordering of colloid nanoparticles in an electrolyte solution with subsequent fixation in an elastic gel matrix.]*

Yuri also configured the onboard Russian TV system with its conversion to Ku-band in support of an extended (10:00am-1:00pm) ground-controlled multicast downlink operation in digital packets to MCC-H and then on to TsUP-Moscow via the COL-CC (Columbus Control Center) in Oberpfaffenhofen, as a test for the Progress 27P docking on 12/26 morning.

The CDR relocated the TEPC (Tissue Equivalent Proportional Counter), the primary radiation measurement tool in the ISS, to Node-2. *[Peggy also swapped out the power/data cable and wrapped the new cable with a layer of Kapton tape, to prevent the creation of debris if the cable's mesh sheathing starts to degrade, as seen on the current cable.]*

With the Vozdukh CO<sub>2</sub> removal system running in automated mode, the FE-1 performed the periodic (monthly) functional closure test of its spare emergency vacuum valves (AVK), in the spare parts kit. Afterwards, Malenchenko switched the Vozdukh back to manual mode 5 via the on-board computer system. *[The AVKs are critical because*

*they close the Vozdukh's vacuum access lines in the event of a malfunction in the regular vacuum valves (BVK) or a depressurization in the Vozdukh valve panel (BOA). Access to vacuum is required to vent CO<sub>2</sub> during the regeneration of the absorbent cartridges (PP). During nominal operation, the AVK valves remain open.]*

CDR Whitson ran the periodic check of active U.S. payloads, i.e., cleaning the ANITA (Analyzing Interferometer for Ambient Air) inlet plus inspecting and filter cleaning of the CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The CGBA incubator is controlled from the ground, with automatic video downlinked to Earth. ANITA continues to collect data every six seconds and downlinks the data daily to the ground team. ANITA monitors low levels of potential gaseous contaminants in the ISS cabin atmosphere with a capability of simultaneously monitoring 32 gaseous contaminants. The experiment is testing the accuracy and reliability of this technology as a potential next-generation atmosphere trace-gas monitoring system for ISS and future spacecraft. This is a cooperative investigation with ESA.]*

Peggy conducted a maintenance inspection on the CEVIS (Cycle Ergometer with Vibration Isolation) and took video imagery of damaged isolators for ground inspection.

The FE-2 configured the video equipment in the SM for filming Peggy's and his own subsequent workout on the RED resistive exerciser, for biomechanical assessment of the hardware status by ground engineers. *[The footage from the two sessions was then to be transferred from camcorder to VTR (Video Tape Recorder) for subsequent downlink to the ground when Ku-band is available.]*

The crewmembers performed their regular 2.5-hr physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill with vibration isolation (FE-1, FE-2), RED resistive exercise device (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Dan Tani copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Peggy performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Working from his "time permitting" discretionary task list, the FE-1 later handled the daily IMS maintenance, updating/editing its standard "delta file" including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

At ~3:50pm EST, Dan Tani is scheduled for a PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

CEO photo targets uplinked for today again were **Polar Mesospheric Clouds** (PMC — also known as noctilucent clouds) over selected ground sites (12 minutes for each). *(Southern spring is the season for relatively uncommon polar mesospheric clouds to form very high over Antarctica. PMC are being studied as part of the International Polar Year [IPY] investigation of climate change in high latitudes. PMC form in the stratosphere and higher, i.e. well above the lowest layer of the atmosphere [troposphere, or weather layer, characterized by clouds, and an orange tinge produced by brushfire smoke, smog, etc.]. The AIM satellite (Aeronomy of Ice in the Atmosphere) has just been launched to investigate how PMC form and why they are apparently becoming thicker and brighter. ISS/CEO imagery will complement images from AIM and from the ground. The collaborating IPY scientist is excited to receive any images ISS may acquire. Collaborating Swedish scientists have arrived at a base in Antarctica (73S 13 W) for PMC observation.)*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:14am EST [= epoch]):

Mean altitude -- 336.1 km

Apogee height -- 336.9 km

Perigee height -- 335.2 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0001208

Solar Beta Angle -- -66.4 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 24 hours -- 95 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 52080

**Significant Events Ahead** (all dates Eastern Standard, some changes possible. NET = Not Earlier Than):

12/26/07 -- Progress M-62/27P docking (DC1); ~3:25am

12/30/07 -- ISS Reboost (phasing)

01/10/08 -- NET: STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.

01/12/08 -- NET: STS-122/Atlantis/1E docking

01/21/08 -- NET: STS-122/Atlantis/1E undocking

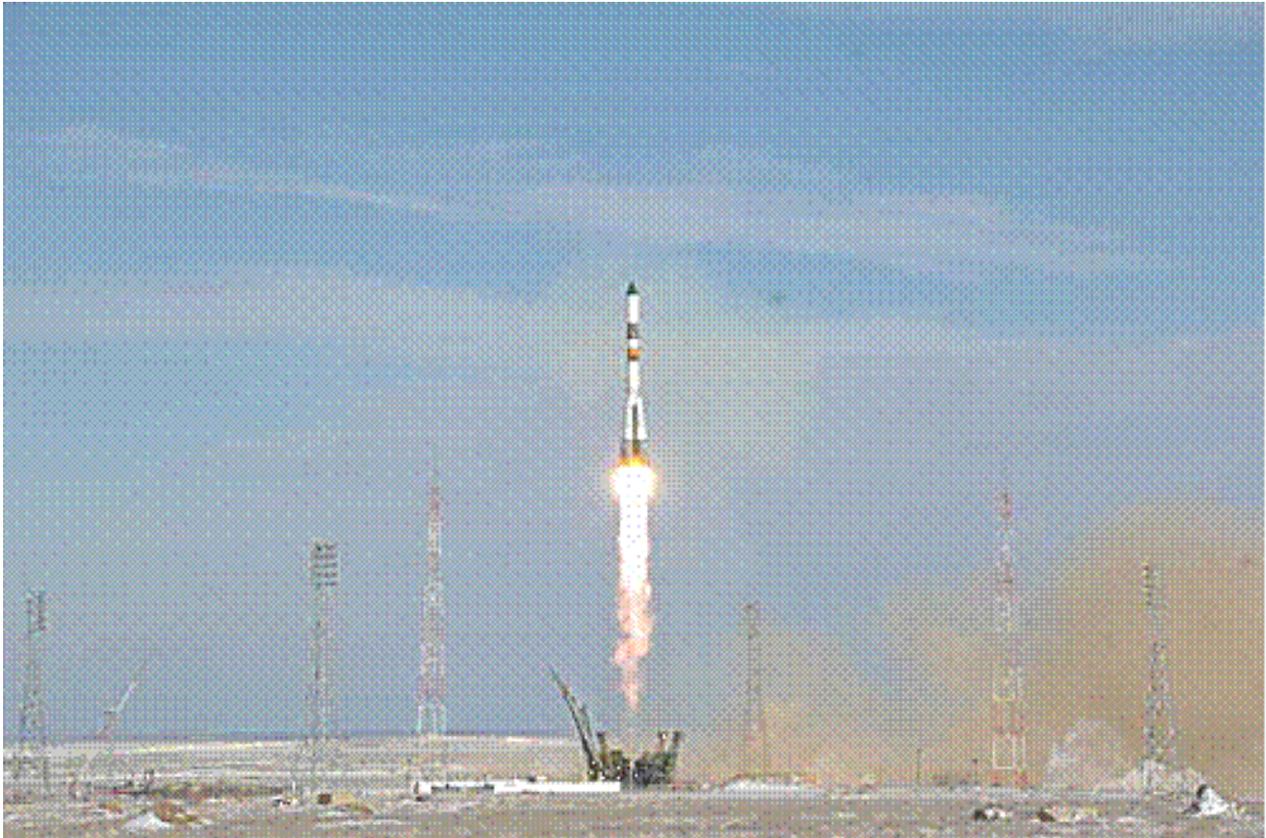
01/31/08 -- **Explorer-1 50 Years (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at

<http://usspace50.com/>

02/06/08 -- Progress M-62/27P undocking & reentry  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking (DC1)  
02/22/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/06/08 -- ATV-1 Demo Day 1  
03/12/08 -- ATV-1 Demo Day 2  
03/15/08 -- ATV-1 Demo Day 3 & Docking (SM aft port)  
04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
08/07/08 -- NET: ATV-1 undocking (from SM aft port)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/09/08 -- Progress M-64/29P undocking (from DC1)  
09/10/08 -- Progress M-66/31P launch  
09/12/08 -- Progress M-66/31P docking (DC1)  
09/18/08 -- STS-126/Discovery/ULF2 launch – MPLM Leonardo, LMC  
09/20/08 -- STS-126/Discovery/ULF2 docking  
10/01/08 -- STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **NASA 50 Years**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/12/08 -- Soyuz TMA-13/17S launch  
10/14/08 -- Soyuz TMA-13/17S docking (SM aft port)  
10/23/08 -- Soyuz TMA-12/16S undocking (FGB nadir)  
11/03/08 -- Soyuz TMA-13/17S relocation (from SM aft to FGB nadir)  
11/06/08 -- STS-119/Discovery/15A launch – S6 truss segment  
11/08/08 -- STS-119/Discovery/15A docking  
11/17/08 -- STS-119/Discovery/15A undocking  
11/20/08 -- **ISS 10 Years**  
11/26/08 -- Progress M-67/32P launch  
11/28/08 -- Progress M-67/32P docking (SM aft port)  
04/15/09 -- **Constellation's Ares I-X Launch**  
05/??/09 -- **Six-person crew on ISS** (following Soyuz 18S-2 docking)

04/??/10 -- STS-132/Discovery/20A – Node-3 + Cupola.

Note: The daily ISS On-Orbit Status reports can also be found at [http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)



**Launch of Soyuz-U mit Progress M-62 (27P) at Baikonur (12/23/07).**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/23/07  
**Date:** Sunday, December 23, 2007 2:45:33 PM  
**Attachments:**

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### **ISS On-Orbit Status 12/23/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for CDR Whitson, FE-1 Malenchenko and FE-2 Tani. Ahead: Week 10 of Increment 16.*

With the usual dependability, **Progress M-62/27P launched nominally this morning at Baikonur at 2:12am EST.** Orbit insertion and 3<sup>rd</sup> stage separation were nominal at ~2:21:30am. Critical antennae and solar array deployments took place without issue. Docking is scheduled on Wednesday, 12/26 (~3:25am EST). *Congrats, Baikonur!*

Before breakfast, FE-2 Dan Tani and CDR Peggy Whitson completed their daily access of the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging and filling in questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for downlink. *[To monitor the crewmembers' sleep/wake patterns and light exposure, Dan and Peggy wear a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

Upon wakeup, Dr. Whitson also performed the last sampling of her 3<sup>rd</sup> session with the NASA/JSC experiment NUTRITION w/Repository, collecting a final urine sample for storage in the MELFI (Minus-Eighty Laboratory Freezer for ISS). The sampling kit was then stowed away. Peggy's next NUTRITION w/Repository activity will be her FD120 (Flight Day 120) session. *[The current NUTRITION project is the most comprehensive in-flight study done by NASA to date of human physiologic changes during long-duration space flight. It includes measures of bone metabolism, oxidative damage, nutritional assessments, and hormonal changes, expanding the previous Clinical Nutritional Assessment profile (MR016L) testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R*

+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]

Today Dan Tani was the subject for the Braslet experiment (SDTO/Station Development Test Objective), holding still for his second ultrasound scanning session by Peggy as operator (for which Dan had to abstain from caffeine 12 hrs prior to the scan session, heavy meals 4 hrs before and any food at all 2 hrs prior to the scan, plus no exercise 2 hours before and no liquids 30 mins before). *[The SDTO-17011 "Validation of On-Orbit Methodology for the Assessment of Cardiac Function and Changes in the Circulating Volume Using Ultrasound and Braslet-M Occlusion Cuffs (Braslet)" is a collaborative effort between NASA and the Russian FSA (Federal Space Agency), with the goal to establish a valid ultrasound methodology for assessing a number of aspects of central and peripheral hemodynamics and cardiovascular function, specifically in rapid changes in intravascular circulating volume. Braslet uses Braslet-M occlusion cuffs, i.e., the Russian-made operational countermeasure already pre-calibrated and available onboard for each ISS crewmember. Braslet employs multiple modes of ultrasound imaging and measurements, in combination with short-term application of Braslet-M occlusive cuffs and cardiopulmonary maneuvers (Valsalva, Mueller) to demonstrate and to evaluate the degree of changes in the circulating volume on orbit. This will be accomplished by performing echocardiographic examinations in multiple modes (including Tissue Doppler mode), ultrasound measurements of lower extremity venous and arterial vascular responses to Braslet-M device under nominal conditions and also during cardiopulmonary Mueller and Valsalva maneuvers. Identical measurements will be repeated without Braslet-M, with Braslet-M applied, and immediately after releasing the occlusion device.]*

The FE-2 performed his daily status check on the BCAT-3 (Binary Colloidal Alloy Test-3) science payload, running by itself in Node-2 since 12/13 (briefly interrupted for EVA-13 photo support). The status check, conducted on the last image taken by the DCS 760 digital still camera which is controlled by EarthKAM software on an A31p laptop, is to verify proper image focus and camera alignment. *[The SSC (Station Support Computer) is taking photography of the phase separation occurring in the BCAT Sample 3, with the photo flash going off every half hour.]*

FE-1 Malenchenko conducted regular service on the Vozdukh CO<sub>2</sub> (Carbon Dioxide) removal system, first switching it via on-board computer system to automatic control mode and later back to manual mode 5.

Afterwards, Yuri Malenchenko completed the daily routine maintenance of the Service Module (SM)'s SOZh environment control & life support system, with the regular replacements in its toilet system (ASU), plus the periodic checkout/

verification of IP-1 airflow sensors in the various Russian Segment hatchways, including the SM-to-DC1 (22P) tunnel, and the FGB-to-Node and FGB-to-Soyuz passageways. *[Regular daily SOZh maintenance includes checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers. Weekly SOZh reports (on Sundays) to TsUP/Moscow deal with number & dates of water and urine containers, counter readings of water consumption & urine collection, and total operating time of the POTOK air filtration system.]*

The crewmembers performed their regular 2.5-hr physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill with vibration isolation (FE-1), RED resistive exercise device (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

The FE-2, who is mourning the loss of his mother, was scheduled for two PFCs (Private Family Conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop), one at ~10:45am EST and the other at ~5:30pm.

Working off his "time permitting" discretionary task list, Yuri conducted his fourth run of the Russian DZZ-2 "Diatomeya" ocean observations program, using the NIKON-F5 still camera with 80-200 mm Nikkor zoom lens to record high production zones and associated oceanic phenomena (cloud pattern, hydrodynamics) in the target areas of Pacific and Atlantic Ocean. *[Uplinked target zones were the coastal area of Brazil, Gibraltar and the northern waters of Mediterranean Sea in the Atlantic Ocean, and coral islands and atolls of Oceania and the California Bay in the Pacific Ocean.]*

A second job item on the FE-1's discretionary list for today was another KPT-3 session to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON) using the Nikon D1X digital camera with SIGMA 300-800mm telephoto lens. *[Targets today were contamination areas in the Vistula River in Poland and in the Pacific Ocean. KPT-3 photography has been a frequent earth observing experiment for ECON.]*

CEO photo targets uplinked for today were **Polar Mesospheric Clouds** (PMC — also known as noctilucent clouds) over selected ground sites (12 minutes for each). *(Southern spring is the season for relatively uncommon polar mesospheric clouds to form very high over Antarctica. PMC are being studied as part of the International Polar Year [IPY] investigation of climate change in high latitudes. PMC form in the stratosphere and higher, i.e. well above the lowest layer of the atmosphere [troposphere, or weather layer, characterized by clouds, and an orange*

*tinge produced by brushfire smoke, smog, etc.]. The AIM satellite (Aeronomy of Ice in the Atmosphere) has just been launched to investigate how PMC form and why they are apparently becoming thicker and brighter. ISS/CEO imagery will complement images from AIM and from the ground. The collaborating IPY scientist is excited to receive any images ISS may acquire. Collaborating Swedish scientists have arrived at a base in Antarctica (73S 13 W) for PMC observation.)*

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<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

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Apogee height -- 337.0 km

Perigee height -- 335.3 km

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Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0001214

Solar Beta Angle -- -62.0 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 24 hours -- 128 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 52065

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

NET = Not Earlier Than):

12/26/07 -- Progress M-62/27P docking (DC1); ~3:25am

12/30/07 -- ISS Reboost (phasing)

01/10/08 -- NET: STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.

01/12/08 -- NET: STS-122/Atlantis/1E docking

01/21/08 -- NET: STS-122/Atlantis/1E undocking

01/31/08 -- **Explorer-1 50 Years (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com>]

02/06/08 -- Progress M-62/27P undocking & reentry

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking (DC1)

02/22/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/06/08 -- ATV-1 Demo Day 1  
03/12/08 -- ATV-1 Demo Day 2  
03/15/08 -- ATV-1 Demo Day 3 & Docking (SM aft port)  
04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
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04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS  
04/26/08 -- STS-124/Discovery/1J docking  
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05/14/08 -- Progress M-64/29P launch  
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08/07/08 -- NET: ATV-1 undocking (from SM aft port)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/09/08 -- Progress M-64/29P undocking (from DC1)  
09/10/08 -- Progress M-66/31P launch  
09/12/08 -- Progress M-66/31P docking (DC1)  
09/18/08 -- STS-126/Discovery/ULF2 launch – MPLM Leonardo, LMC  
09/20/08 -- STS-126/Discovery/ULF2 docking  
10/01/08 -- STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **NASA 50 Years**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/12/08 -- Soyuz TMA-13/17S launch  
10/14/08 -- Soyuz TMA-13/17S docking (SM aft port)  
10/23/08 -- Soyuz TMA-12/16S undocking (FGB nadir)  
11/03/08 -- Soyuz TMA-13/17S relocation (from SM aft to FGB nadir)  
11/06/08 -- STS-119/Discovery/15A launch – S6 truss segment  
11/08/08 -- STS-119/Discovery/15A docking  
11/17/08 -- STS-119/Discovery/15A undocking  
11/20/08 -- **ISS 10 Years**  
11/26/08 -- Progress M-67/32P launch  
11/28/08 -- Progress M-67/32P docking (SM aft port)  
04/15/09 -- **Constellation’s Ares I-X Launch**  
05/??/09 -- **Six-person crew on ISS** (following Soyuz 18S-2 docking)  
04/??/10 -- STS-132/Discovery/20A – Node-3 + Cupola.

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[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [vonPuttkamer, Jesco H. \(HQ-CJ000\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/22/07  
**Date:** Saturday, December 22, 2007 2:00:38 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/22/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- off-duty day for CDR Whitson, FE-1 Malenchenko and FE-2 Tani except for housekeeping and voluntary work. **Happy 46<sup>th</sup> Birthday, Yuri Ivanovich!***

**Last night, Progress M-61/26P successfully undocked** from the ISS at 10:59pm EST (hook opening command: 10:57pm). The separation appeared smooth with no vibrations noted. Downlinked video from the cargo vehicle showed that the docking ring surface was nominal. The first separation burn was performed at 11:03pm and a second separation burn followed at 11:09pm. The spacecraft initially moved aft of the station, then forward, overtaking the ISS on a lower (faster) orbit. 26P will remain in orbit in free flight for 3-4 weeks, continuing to phase out in front of the ISS (about 40 km per orbit) as part of a Russian Earth observation experiment.

After the undocking, FE-1 Yuri Malenchenko manually closed the PEV (Pressure Equalization Valve) between the DC1 and its docking port vestibule.

Before breakfast, FE-2 Dan Tani and CDR Peggy Whitson (who now has joined in this activity) completed their daily access of the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging and filling in questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

Also before breakfast, Dr. Whitson completed the last day (FD 60) of her 3<sup>rd</sup> session with the NASA/JSC experiment NUTRITION w/Repository. Today she conducted the 24-hour urine collections starting with the first void early in the

morning and continuing through tomorrow morning. The samples were stored in the MELFI (Minus-Eighty Laboratory Freezer for ISS) and the sampling kit was then stowed away. *[The current NUTRITION project is the most comprehensive in-flight study done by NASA to date of human physiologic changes during long-duration space flight. It includes measures of bone metabolism, oxidative damage, nutritional assessments, and hormonal changes, expanding the previous Clinical Nutritional Assessment profile (MR016L) testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

The crew performed the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

The CDR conducted her first self-scanning session for the Braslet experiment (SDTO/Station Development Test Objective), leading off with a video review and followed by the actual ultrasound scanning activity on herself (for which she had to abstain from caffeine 12 hrs prior to the scan session, heavy meals 4 hrs before and any food at all 2 hrs prior to the scan, plus no exercise 2 hours before and no liquids 30 mins before). *[The SDTO-17011 "Validation of On-Orbit Methodology for the Assessment of Cardiac Function and Changes in the Circulating Volume Using Ultrasound and Braslet-M Occlusion Cuffs (Braslet)" is a collaborative effort between NASA and the Russian FSA (Federal Space Agency), with the goal to establish a valid ultrasound methodology for assessing a number of aspects of central and peripheral hemodynamics and cardiovascular function, specifically in rapid changes in intravascular circulating volume. Braslet uses Braslet-M occlusion cuffs, i.e., the Russian-made operational countermeasure already pre-calibrated and available onboard for each ISS crewmember. Braslet employs multiple modes of ultrasound imaging and measurements, in combination with short-term application of Braslet-M occlusive cuffs and cardiopulmonary maneuvers (Valsalva, Mueller) to demonstrate and to evaluate the degree of changes in the circulating volume on orbit. This will be accomplished by performing echocardiographic examinations in multiple modes (including Tissue Doppler mode), ultrasound measurements of lower extremity venous and arterial vascular responses to Braslet-M device under nominal conditions and also during cardiopulmonary Mueller and Valsalva maneuvers. Identical measurements will be repeated without Braslet-M, with Braslet-M applied, and immediately after releasing the occlusion device.]*

For FE-2 Tani, it was time again for his daily status check on the BCAT-3 (Binary Colloidal Alloy Test-3) science payload, running by itself in Node-2 since 12/13 (briefly interrupted for EVA-13 photo support). The status check, conducted on the last image taken by the DCS 760 digital still camera which is controlled by EarthKAM software on an A31p laptop, is to verify proper image focus and camera alignment. *[The SSC (Station Support Computer) is taking photography of the phase separation occurring in the BCAT Sample 3, with the photo flash going off every half hour.]*

In the Lab, Peggy continued her support of the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment in the MSG (Microgravity Science Glovebox) facility, terminating SPU-11 (Sample Processing Unit #11) processing, transferring its data to the MLC (MSG Laptop Computer) and verifying them, then removing SPU-11, installing a new SPU (#10), and finally turning the payload off. Later, the MSG was also powered off. *[CSLM-2 examines the kinetics of competitive particle growth within a liquid matrix. During this process, small particles shrink by losing atoms to larger particles, causing the larger particles to grow (coarsen) within a liquid lead/tin matrix. This study defined the mechanisms and rates of coarsening that govern the manufacture with metals from turbine blades to dental amalgam fillings.]*

Working briefly on the EXPRESS Rack 1 (ER1) laptop computer, Whitson modify its “crash recovery” parameter, changing the location of the memory dump analysis file to make downlinking more efficient.

Malenchenko performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists among else of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

The crewmembers performed their regular 2.5-hr physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, the FE-2 will transfer the exercise data file to the MEC laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~3:20am EST, Yuri Malenchenko, born today 46 years ago in the Ukraine, participated in a Telebridge radio hook-up with friends and family at an event in the

Ukrainian city of Kiev via RGS (Russian Groundsites).

The FE-1 and FE-2 each were scheduled for a PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop), Yuri at ~5:30am, Dan at ~3:05pm.

From his voluntary task list, Yuri conducted another session of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D2X digital camera with 800 mm focal length lenses to take pictures of catastrophic events for subsequent downlink via BSR-TM. *[Uplinked target zones for today were slopes and ravine terrain to the south of Voronezh, the Alps, the Allaline and other glaciers near arc-shaped water reservoir dams, Poland's Vistula river showing 20-km long contamination spreading on 12/17 towards the Baltic Sea, and the Huascarán volcano in Peru.]*

*Electron Activation Update:* Yesterday, when Yuri assisted the ground in activation the Elektron oxygen generator in the standard 32 amp mode, the system came on in 11 amps mode. A recently (11/27) installed electronic interference filter (to prevent RFI with the ATV/Automated Transfer Vehicle) felt hot to Yuri's touch, who, on ground advice, turned off the Elektron, removed the filter and reconnected the cables. The electrolysis machine was then successfully reactivated in 32 amp mode and is now operating nominally at 24 amps.

*Progress Launch Preps:* At Baikonur, Kazakhstan, final preparations continue for the launch of the Progress M-62/27P cargo vehicle tomorrow morning at 2:12am EST.

### **Weekly Science Update** (Expedition Sixteen -- Week 9)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* In progress.

*ANITA:* Completed.

*BCAT (Binary Colloidal Alloy Test):* There will be a reboost on 12/29 and thruster firings on 12/30, both of which could significantly impact the quality of BCAT science. The ground team feels that it's not likely that they will get two runs before the Shuttle docking, so they are going to remix sample 3 on 12/31 after the thruster firings and run sample 3 for ~14 days.

*CARDIOCOG-2:* Completed.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS):* Reserve.

*CFE (Capillary Flow Experiment):* Reserve.

*CSI-2/CGBA (CGBA Science Insert #2/Commercial Generic Bioprocessing Apparatus):* In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* Complete.

*CSLM-2 (Coarsening in Solid-Liquid Mixtures 2):* CSLM-2 SPU-11 has completed vacuum vent cycles 1 through 4. SPU-11 (10 hr heat soak) started processing on 12/21 at ~11:00am EST.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Complete.

*EPO (Educational Payload Operations):* Reserve.

*ETD (Eye Tracking Device):* In progress.

*Integrated Immune:* In progress.

*KUBIK-FM1/ KUBIK-FM2 Centrifuge/Incubators:* FE-1 Malenchenko has retrieved the telemetry data of the two KUBIK devices. The data is related to the 16S/15S Soyuz mission Biology Program and has been downlinked to ground.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* MULTIGEN-1 samples will be downloaded on STS-122 (1E).

*MSG-SAME (Microgravity Science Glovebox):* Complete.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION/REPOSITORY:* In progress..

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):*

Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight)*: Peggy and Dan's next Sleep Actiwatch Download/Initialization session will be placed on the task list from 12/26/07-1/2/08. The Actiatches will stop taking data on 1/3/08.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite)*: In progress. To be conducted tomorrow (12/2).

*Swab (Characterization of Microorganisms & Allergens in Spacecraft)*: In progress.

*TRAC (Test of Reaction & Adaptation Capabilities)*: Planned.

*CEO (Crew Earth Observation)*: On-going.

CEO photo targets uplinked for today were **Polar Mesospheric Clouds** over Antarctica (*PMC — also known as noctilucent clouds*). *Southern spring is the season for relatively uncommon polar mesospheric clouds to form very high over Antarctica. PMC are being studied as part of the International Polar Year [IPY] investigation of climate change in high latitudes. PMC form in the stratosphere and higher, i.e. well above the lowest layer of the atmosphere [troposphere, or weather layer, characterized by clouds, and an orange tinge produced by brushfire smoke, smog, etc.]. The AIM satellite (Aeronomy of Ice in the Atmosphere) has just been launched to investigate how PMC form and why they are apparently becoming thicker and brighter. ISS/CEO imagery will complement images from AIM and from the ground. The collaborating IPY scientist is excited to receive any images ISS may acquire. Collaborating Swedish scientists have arrived at a base in Antarctica (73S 13 W) for PMC observation.)*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:13am EST [= epoch]):

Mean altitude -- 336.3 km

Apogee height -- 337.0 km

Perigee height -- 335.5 km

Period -- 91.26 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0001097

Solar Beta Angle -- -57.5 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in the last 24 hours -- 66 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 52049

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

NET = Not Earlier Than):

12/23/07 -- Progress M-62/27P launch; ~2:12am  
12/26/07 -- Progress M-62/27P docking (DC1); ~3:25am  
12/30/07 -- ISS Reboost (phasing)  
01/10/08 -- NET: STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.  
01/12/08 -- NET: STS-122/Atlantis/1E docking  
01/21/08 -- NET: STS-122/Atlantis/1E undocking  
01/31/08 -- **Explorer-1 50 Years (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [*Check it out at <http://usspace50.com>*]  
02/06/08 -- Progress M-62/27P undocking & reentry  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking (DC1)  
02/22/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/06/08 -- ATV-1 Demo Day 1  
03/12/08 -- ATV-1 Demo Day 2  
03/15/08 -- ATV-1 Demo Day 3 & Docking (SM aft port)  
04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
08/07/08 -- NET: ATV-1 undocking (from SM aft port)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/09/08 -- Progress M-64/29P undocking (from DC1)  
09/10/08 -- Progress M-66/31P launch  
09/12/08 -- Progress M-66/31P docking (DC1)

09/18/08 -- STS-126/Discovery/ULF2 launch – MPLM Leonardo, LMC  
09/20/08 -- STS-126/Discovery/ULF2 docking  
10/01/08 -- STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **NASA 50 Years**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/12/08 -- Soyuz TMA-13/17S launch  
10/14/08 -- Soyuz TMA-13/17S docking (SM aft port)  
10/23/08 -- Soyuz TMA-12/16S undocking (FGB nadir)  
11/03/08 -- Soyuz TMA-13/17S relocation (from SM aft to FGB nadir)  
11/06/08 -- STS-119/Discovery/15A launch – S6 truss segment  
11/08/08 -- STS-119/Discovery/15A docking  
11/17/08 -- STS-119/Discovery/15A undocking  
11/20/08 -- **ISS 10 Years**  
11/26/08 -- Progress M-67/32P launch  
11/28/08 -- Progress M-67/32P docking (SM aft port)  
04/15/09 -- **Constellation's Ares I-X Launch**  
05/??/09 -- **Six-person crew on ISS** (following Soyuz 18S-2 docking)  
04/??/10 -- STS-132/Discovery/20A – Node-3 + Cupola.

Note: The daily ISS On-Orbit Status reports can also be found at  
[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/21/07  
**Date:** Friday, December 21, 2007 2:15:47 PM  
**Attachments:** [image001.gif](#)

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## **ISS On-Orbit Status 12/21/07**

All ISS systems continue to function nominally, except those noted previously or below.

After wakeup and before breakfast, FE-2 Dan Tani completed his daily access of the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging and filling in questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

Having passed the Day 60 mark in her flight, Dr. Peggy Whitson began her third session with the NASA/JSC experiment NUTRITION w/Repository, for which she had to forego exercising and food intake for eight hours. Today's protocol consisted of two blood draws (for Serum & Heparin). Later, the CDR set up the equipment for the 24-hour urine collections which start with the first void early tomorrow morning and continue through Sunday morning. *[Acting as operator, Dan Tani as performed phlebotomy on Peggy Whitson, i.e., drawing blood samples (from an arm vein) which was first allowed to coagulate in the Repository, then spun in the HRF RC (Human Research Facility/Refrigerated Centrifuge) and finally placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. Background: NUTRITION is the most comprehensive in-flight study done by NASA to date of human physiologic changes during long-duration space flight; this includes measures of bone metabolism, oxidative damage, nutritional assessments, and hormonal changes. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included*

*for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

FE-2 Tani conducted his second session of the LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)/Phase 2 experiment, completing another LOCAD exploratory survey by taking single swab samples from five more surface sites in the station. In Phase 2, no media sides have to be prepared. *[LOCAD uses small, thumb-sized “microfluidic” cartridges that are read by the experiment reader. The cartridges contain dried extract of horseshoe crab blood cells and colorless dye. In the presence of the bacteria, the dried extract reacts strongly to turn the dye a green color. Therefore, the more green dye, the more microorganisms there are in the original sample. The handheld device tests this new analysis technology by sampling for the presence of gram negative bacteria in the sample in about 15 minutes, showing the results on a display screen. Background: Lab-on-a-Chip technology has an ever-expanding range of applications in the biotech industry. Chips are available (or in development) which can also detect yeast, mold, and gram positive bacteria, identify environmental contaminants, and perform quick health diagnostics in medical clinics. The technology has been used to swab the MERs (Mars Exploration Rovers) for planetary protection. With expanded testing on ISS, began by Sunita Williams in March/April this year, this compact technology has broad potential applications in space exploration--from monitoring environmental conditions to monitoring crew health. The current study should prepare for long-duration exploration by demonstrating a system that enables the crew to perform biochemical analysis in space without having to return samples to Earth.]*

Afterwards, the FE-2 performed his daily status check on the BCAT-3 (Binary Colloidal Alloy Test-3) science payload, running by itself in Node-2 since 12/13 (briefly interrupted for EVA-13 photo support). The status check, conducted on the last image taken by the DCS 760 digital still camera which is controlled by EarthKAM software on an A31p laptop, is to verify proper image focus and camera alignment. *[The SSC (Station Support Computer) is taking photography of the phase separation occurring in the BCAT Sample 3, with the photo flash going off*

*every half hour. Today Dan received ground feedback that “the photos are looking really good now!”]*

In the Lab, the CDR continued crew support of the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment in the MSG (Microgravity Science Glovebox) facility, terminating the final (fourth) vacuum draw on the SPU11 (Sample Processing Unit 11) and initiating sample processing on SPU11, to be finished prior to Progress 26P undocking tonight to avoid vibration disturbances on the processing. *[CSLM-2 examines the kinetics of competitive particle growth within a liquid matrix. During this process, small particles shrink by losing atoms to larger particles, causing the larger particles to grow (coarsen) within a liquid lead/tin matrix. This study defined the mechanisms and rates of coarsening that govern the manufacture with metals from turbine blades to dental amalgam fillings.]*

Working in the Airlock (A/L) on more post-EVA cleanup tasks, Peggy Whitson set up and started the periodic scrubbing process on the EMUs' (Extravehicular Mobility Units) cooling water loops, by initiating its ionic and particulate matter filtration (using a 3-micron filter) on suits #3006 & #3018. The cooling loops were then reconfigured and the EMU water processing kit disassembled and stowed. *[Purpose of the scrubbing, including iodination of the LCVGs (Liquid Cooling & Ventilation Garments) for biocidal maintenance, is the elimination of any biomass and particulate matter that may have accumulated in the loops.]*

The CDR also terminated the regeneration of METOX (Metal Oxide) canisters #0020 & #0021 in the Airlock (A/L) bakeout oven. *[METOX CO<sub>2</sub> absorption cans, rather than LiOH (Lithium Hydroxide) filters, were used on 12/19 both in the A/L for the Campout and in the two EMUs for the spacewalk.]*

Afterwards, Peggy checked out the U.S. Sound Level Meter (SLM) instrument and then used it to conduct the periodic noise level measurements program in the station interior for a 2-hr acoustic survey, including transfer of the recorded data to the MEC (Medical Equipment Computer). *[The acoustic level may have been somewhat impacted by the fans running in the A/L for the EMU iodination procedure. A total of 48 acoustic measurements are obtained at 13 locations in the Lab (including in the TESS {Temporary Sleep Station} with door closed), four locations in Node-1, three locations in the A/L, six locations in Node-2, 11 locations in the SM, three locations in the DC1 Docking Compartment, and 4 locations in the FGB.. The survey also includes four crew preference locations taken at their perceived loudest locations in the station. The SLM gives instantaneous noise levels and their frequency spectra, which are transferred to the MEC laptop via an RS232 cable and later downlinked with regular CHeCS (Crew Health Care Systems) data dump or via OCA.]*

For tonight's operation of SAMS (Space Acceleration Measurement System), Tani configured the ER1 (EXPRESS Rack 1) by connecting its MTL (Moderate Temperature Loop) cooling jumper QDs (quick disconnects) to the nearby LAB1O2 UIP (Utility Interface Panel, "Z-panel"). Later, Dan will also verify proper functioning of the SAMS laptop in ER4. *[Background: Progress 26P undocking tonight will be monitored with three instrumentation systems measuring vibrational dynamics of ISS structural elements during the undocking: SDMS (Structural Dynamic Measurement System), SAMS, and MAMS (Microgravity Acceleration Measurement System). The ground-controlled SDMS can store only 10 minutes of data and has no permanent memory. Thus, the goal is to acquire at least 2 min of data prior to undocking and 3 min after, with data downlink within 24 hours after the data collection. MAMS and SAMS should be up and running 2 hours before the undocking to ensure data collection during the actual event.]*

Returning to the ITCS (Internal Thermal Control System) panels later today, the FE-2 will demate and take down the ITCS LTL (Internal Thermal Control System/Low Temperature Loop) jumper at the CDRA-supporting LAB1D6 rack, after the CDRA (Carbon Dioxide Removal Assembly) failed yesterday due to a warm slug of water resulting from an unexpected transition of LTL to single LT. *[Since CO<sub>2</sub> levels during METOX remained acceptable level, CDRA did not have to be reactivated.]*

Unstowing the two HRDs (High Rate Dosimeters) from the Passive Dosimetry Kit, Dan Tani replaced their batteries with fresh ones, as is done once a year to ensure the units are ready to be used in a contingency situation. *[Purpose of the hand-held HRDs is to measure & record high rate radiation data, i.e., dose (in Gy) and dose rate (in Gy/hr or cGy/hr), and relay to MCC-H during a contingency event. The instruments measure absorbed dose, also known as total ionizing dose (TID), a measure of the energy deposited in a medium by ionizing radiation. Since it is equal to the energy deposited per unit mass of medium, it the unit Joule/kg, which is given the special name "gray" (Gy).]*

The FE-2 also filled out the regular FFQ (Food Frequency Questionnaire), his 7<sup>th</sup>, on the MEC. *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. At TsUP/Moscow, food specialists are currently preparing the Russian food "menu" for delivery by Progress M-63/28P next February. 28P will carry "bonus food" for Peggy and Yuri, plus about 15 kg of fresh food items (apples, grapefruit, oranges, lemons, garlic) in two containers.]*

CDR Whitson unstowed and assembled the HRF (Human Research Facility) ultrasound hardware for Day 1 of the Braslet experiment (SDTO/Station Development Test Objective). *[The SDTO-17011 "Validation of On-Orbit Methodology for the Assessment of Cardiac Function and Changes in the Circulating Volume Using Ultrasound and Braslet-M Occlusion Cuffs (Braslet)" is a collaborative effort between NASA and the Russian FSA (Federal Space Agency), with the goal to establish a valid ultrasound methodology for assessing a number of aspects of central and peripheral hemodynamics and cardiovascular function, specifically in rapid changes in intravascular circulating volume. Braslet uses Braslet-M occlusion cuffs, i.e., the Russian-made operational countermeasure already pre-calibrated and available onboard for each ISS crewmember. Braslet employs multiple modes of ultrasound imaging and measurements, in combination with short-term application of Braslet-M occlusive cuffs and cardiopulmonary maneuvers (Valsalva, Mueller) to demonstrate and to evaluate the degree of changes in the circulating volume on orbit. This will be accomplished by performing echocardiographic examinations in multiple modes (including Tissue Doppler mode), ultrasound measurements of lower extremity venous and arterial vascular responses to Braslet-M device under nominal conditions and also during cardiopulmonary Mueller and Valsalva maneuvers. Identical measurements will be repeated without Braslet-M, with Braslet-M applied, and immediately after releasing the occlusion device.]*

Yuri and Peggy completed preparations for Progress M-61/26P undocking tonight on its own free-flyer mission (~10:59pm). *[The FE-1 and CDR finished trash loading and reported completion to the ground for the final Go from TsUP/Moscow, followed by cargo ship activation, tearing down the ventilation air duct, removing the threaded BZV QD (quick disconnect) screw clamps of the SSVP docking & internal transfer system, and closing hatches between 26P and the transfer tunnel (PrK) to the DC1 after taking video of the mating surfaces/seals. They then conducted the one-hour vestibule leak check and downlinked the video imagery of the SM/Progress hatch interface. Russian MCS/thrusters were temporarily inhibited during the clamp removal due to loads constraints.]*

Before sleeptime tonight, Dan will verify closure of the protective Lab science window shutter and power down the onboard amateur/ham radio equipment to prevent RF interference with the departing Progress.

Using the SKDS CMS (Pressure Control & Atmosphere Monitoring System/Countermeasure System), Malenchenko took readings of potentially harmful contaminants in the SM. The hardware was then returned to initial stowage. *[The CMS uses preprogrammed microchips to measure Formaldehyde ( $H_2CO$ , methanal), Carbon Monoxide (CO) and Ammonia ( $NH_3$ ), taking one measurement*

*per microchip.]*

With Progress 26P's oxygen (O<sub>2</sub>) stores depleted yesterday, Yuri today supported the ground's reactivation of the Elektron O<sub>2</sub> generator at 32 amps by monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Malenchenko performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists among else of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Later, Yuri also will conduct the daily IMS (Inventory Management System) maintenance, updating/editing its standard "delta file" including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

At ~3:20am EST, Yuri linked up with TsUP stowage specialists via S-band to conduct the weekly IMS tagup, discussing stowage issues and equipment locations. *[Issues discussed included number of PCMCIA memory cards used for KUBIK experiment data, number of discarded urine transfer hoses & adapters, and confirmation that a large number of trashed items have been stowed in Progress M-61/26P which are not yet showing in the IMS log.]*

At ~3:40pm, the crew is scheduled for their conducted their seventh weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio. *[S/G-2 (Space-to-Ground 2) phone patch via SSC-10 (Station Support Computer 10)].*

The CDR and FE-2 each were scheduled for their weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop), Dan at ~8:05am, Peggy at ~2:45pm.

The crewmembers performed their regular 2.5-hr physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, the FE-2 will transfer the exercise data file to the MEC laptop for

downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*Progress Launch Preps:* At Baikonur, Kazakhstan, preparations continue for the launch of the Progress M-62/27P cargo vehicle on 12/23 (2:12am EST). At 4:00am Moscow time (8:00pm EST last night), the Soyuz-U launch vehicle was rolled out from the Integration Building to the launch pad and installed on the pad. L-2 days activities have been started (*see picture below*).

CEO photo targets uplinked for today were **Polar Mesospheric Clouds** (*PMC — also known as noctilucent clouds*). *Southern spring is the season for relatively uncommon polar mesospheric clouds to form very high over Antarctica. PMC are being studied as part of the International Polar Year [IPY] investigation of climate change in high latitudes. PMC form in the stratosphere and higher, i.e. well above the lowest layer of the atmosphere [troposphere, or weather layer, characterized by clouds, and an orange tinge produced by brushfire smoke, smog, etc.]. The AIM satellite (Aeronomy of Ice in the Atmosphere) has just been launched to investigate how PMC form and why they are apparently becoming thicker and brighter. ISS/CEO imagery will complement images from AIM and from the ground. The collaborating IPY scientist is excited to receive any images ISS may acquire. Collaborating Swedish scientists have arrived at a base in Antarctica (73S 13 W) for PMC observation.*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:49am EST [= epoch]):

Mean altitude -- 336.3 km

Apogee height -- 337.1 km

Perigee height -- 335.6 km

Period -- 91.26 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0001088

Solar Beta Angle -- -52.7 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 24 hours -- 142 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 52033

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

NET = Not Earlier Than):

- 12/21/07 -- Progress M-61/26P undocking (DC1) ~10:59pm (to continue free-flying mission)
- 12/22/07 -- Yuri Malenchenko's Birthday
- 12/23/07 -- Progress M-62/27P launch; ~2:12am
- 12/26/07 -- Progress M-62/27P docking (DC1); ~3:25am
- 12/30/07 -- ISS Reboost (phasing)
- 01/10/08 -- NET: STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.
- 01/12/08 -- NET: STS-122/Atlantis/1E docking
- 01/21/08 -- NET: STS-122/Atlantis/1E undocking
- 01/31/08 -- **Explorer-1 50 Years (1<sup>st</sup> U.S. Satellite on Redstone rocket)** *[Check it out at <http://usspace50.com>]*
- 02/06/08 -- Progress M-62/27P undocking & reentry
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- 02/09/08 -- Progress M-63/28P docking (DC1)
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- 02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS
- 02/16/08 -- STS-123/Endeavour/1J/A docking
- 02/27/08 -- STS-123/Endeavour undocking
- 02/29/08 -- STS-123/Endeavour landing
- 03/06/08 -- ATV-1 Demo Day 1
- 03/12/08 -- ATV-1 Demo Day 2
- 03/15/08 -- ATV-1 Demo Day 3 & Docking (SM aft port)
- 04/07/08 -- Progress M-63/28P undocking (DC1) & reentry
- 04/08/08 -- Soyuz TMA-12/16S launch
- 04/10/08 -- Soyuz TMA-12/16S docking (DC1)
- 04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)
- 04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)
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- 09/10/08 -- Progress M-66/31P launch
- 09/12/08 -- Progress M-66/31P docking (DC1)
- 09/18/08 -- STS-126/Discovery/ULF2 launch – MPLM Leonardo, LMC

09/20/08 -- STS-126/Discovery/ULF2 docking  
10/01/08 -- STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **NASA 50 Years**  
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05/??/09 -- **Six-person crew on ISS** (following Soyuz 18S-2 docking)  
04/??/10 -- STS-132/Discovery/20A – Node-3 + Cupola.

Note: The daily ISS On-Orbit Status reports can also be found at  
[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)



Progress M-62/27P on Soyuz-U on launch pad (12/21/07)



**From:** vonPuttkamer, Jesco H. (HQ-CJ000)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/20/07  
**Date:** Thursday, December 20, 2007 2:02:00 PM  
**Attachments:** [image001.gif](#)

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## **ISS On-Orbit Status 12/20/07**

All ISS systems continue to function nominally, except those noted previously or below.

After wakeup and before breakfast, FE-2 Dan Tani again accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging and completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

In preparation for the arrival of Progress M-62/27P on 12/26 (~3:25am EST), FE-1 Malenchenko and CDR Whitson successfully conducted the standard 3-hr. training course on the TORU teleoperated control system. *[The drill involved a review of procedures and docking/math model data, UHF/S-band tagup with a ground instructor, and onboard training on a special TORU simulation program with video on laptop computer TP2. Flown on the simulator were all phases of rendezvous, flyaround, final approach and docking, plus off-nominal situations like no comm in the SM-to-27P or 27P-to-SM channels, loss of TV feed, display format hang-up on the SM's Simvol-TS screen, and docking failure of TORU before capture. During Kurs-controlled rendezvous, the TORU is in "hot standby" mode, and it would allow Malenchenko to perform necessary guidance functions manually from the SM via two hand controllers in the event of a failure of the "Kurs" automated rendezvous and docking (AR&D) of the Progress. Should the docking attempt fail, the cargo ship's motions would be controlled by the crewmember from a console by viewing the approach to the ISS on the Simvol-TS screen as seen by the Klest-M television camera mounted on the Progress, followed by stationkeeping at 30m. Final approach should then be initiated not earlier than 3:16am (local "night") to ensure RGS coverage, important for situational awareness, although remote TORU control*

*from the ground is not available at this point. Nominal docking will be inside RGS (Russian ground site) coverage.]*

To complete preparations for Progress M-61/26P undocking tomorrow night, to go on its own free-flyer mission (~10:59pm), FE-1 Malenchenko installed the StM Docking Mechanism between Progress and the DC1. *[StM is the "classic" probe-and-cone type, consisting of an active docking assembly (ASA) with a probe (SSh), which fits into the cone (SK) on the passive docking assembly (PSA) for initial soft dock and subsequent retraction to hard dock. The ASA is mounted on the Progress' cargo module (GrO), while the PSA sits on the docking ports of the SM, FGB and DC1.]*

Afterwards, Malenchenko performed the usual dismantling & removal of electronic US-21 matching unit equipment from the cargo ship, to be recycled on another flight. *[After deactivating the US-21 matching unit and SKV-1 dehumidifier and disconnecting the cables of the BITS 2-12 onboard telemetry measurement system, with its VD-SU monitoring mode turned off, the crew unbolted and removed the Progress' US-21 in its container box. US-21, with its associated commutator gear, provides the electronic interface between the Service Module (SM) and the Progress for SM computer control of Progress propulsion. When a Progress is undocked and jettisoned, the valuable electronics are retained, to be recycled on a future vehicle. Tomorrow's final steps for the undocking will include completion of trash loading, activation of the cargo ship and tearing down the ventilation air duct, removing the threaded quick-disconnect (QD) screw clamps of the SSVP the docking & internal transfer system, closing hatches between 26P and the transfer tunnel (PrK) to the DC1 after taking video of the mating surfaces/seals, conducting the vestibule leak check, and downlinking video imagery of the SM/Progress hatch interface.]*

FE-2 Dan Tani and CDR Peggy Whitson conducted their first session of the LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)/Phase 2 experiment, starting off with a teleconference with the Project Scientist at POIC (Payload Operations & Integration Center/Huntsville). After setting up the payload equipment, the CDR completed today's LOCAD exploratory survey activities, taking single swab samples from five different sites in the station. Five more swab samplings will be conducted tomorrow. In Phase 2, no media sides will have to be prepared. *[LOCAD uses small, thumb-sized "microfluidic" cartridges that are read by the experiment reader. The cartridges contain dried extract of horseshoe crab blood cells and colorless dye. In the presence of the bacteria, the dried extract reacts strongly to turn the dye a green color. Therefore, the more green dye, the more microorganisms there are in the original sample. The handheld device tests this new analysis technology by sampling for the presence of gram negative*

*bacteria in the sample in about 15 minutes, showing the results on a display screen. Lab-on-a-Chip technology has an ever-expanding range of applications in the biotech industry. Chips are available (or in development) which can also detect yeast, mold, and gram positive bacteria, identify environmental contaminants, and perform quick health diagnostics in medical clinics. The technology has been used to swab the MERs (Mars Exploration Rovers) for planetary protection. With expanded testing on ISS, began by Sunita Williams in March/April this year, this compact technology has broad potential applications in space exploration--from monitoring environmental conditions to monitoring crew health. The current study should prepare for long-duration exploration by demonstrating a system that enables the crew to perform biochemical analysis in space without having to return samples to Earth.]*

In the Lab, Tani also continued his servicing of the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment on its third ground-controlled session. *[In Step 1, the FE-2 configured the MSG (Microgravity Science Glovebox) facility, closed the vacuum vent, checked for acceptable humidity levels, and opened the SPU-11 (Sample Processing Unit #13) water valve to initiate unattended vacuum preparation. Later, in Step 2, he reset MSG, closed the water valve, again checked for acceptable humidity levels in the sample chamber, then opened the vent & vacuum valves to initiate the required vacuum draw on the sample chamber. CSLM-2 examines the kinetics of competitive particle growth within a liquid matrix. During this process, small particles shrink by losing atoms to larger particles, causing the larger particles to grow (coarsen) within a liquid lead/tin matrix. This study defined the mechanisms and rates of coarsening that govern the manufacture with metals from turbine blades to dental amalgam fillings.]*

During the afternoon, the crew performed a repeat of the previous end-to-end test of analog & digital video transmission & downlinking from the Russian Segment (RS) from the MPEG-2 (Moving Pictures Expert Group 2) encoder via U.S. OpsLAN and Ku-band in "streaming video" packets, after previous attempts had yielded results unacceptable for ATV1 "Jules Verne" docking. For the testing, Tani set up the necessary cabling and three SSC (Station Support Computer) laptops (#4, #6, #9) for viewing and recording MPEG2 stream on the LAN (Local Area Network). *[Afterwards the FE-2 shut down SSC-4 and SSC-6, leaving the SSC-9 A31p powered for downloading its files via OCA.]*

In Node-2, where the BCAT-3 (Binary Colloidal Alloy Test-3) science payload is running by itself since 12/13 (with a brief picture taking interruption for EVA-13 support), the FE-2 performed his daily status check on the A31p laptop controlling the EarthKAM digital still camera, verifying on the last image taken that image focus and alignment remain in check. *[The SSC (Station Support Computer) is taking*

*photography of the phase separation occurring in the BCAT Sample 3, with the photo flash going off every half hour for the next few days.]*

The FE-1 was scheduled to perform another one-hour O<sub>2</sub> (oxygen) refresh of the cabin atmosphere from Progress M-61/26P storage tank, to utilize its gas stores prior to its jettisoning on 12/22.

Whitson ran the periodic check of active U.S. payloads, i.e., cleaning the ANITA (Analyzing Interferometer for Ambient Air) inlet plus inspecting and filter cleaning of the CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload.

*[The CGBA incubator is controlled from the ground, with automatic video downlinked to Earth. ANITA continues to collect data every six seconds and downlinks the data daily to the ground team. ANITA monitors low levels of potential gaseous contaminants in the ISS cabin atmosphere with a capability of simultaneously monitoring 32 gaseous contaminants. The experiment is testing the accuracy and reliability of this technology as a potential next-generation atmosphere trace-gas monitoring system for ISS and future spacecraft. This is a cooperative investigation with the European Space Agency.]*

Peggy also took air samples for the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-CP (Compound Specific Analyzer-Combustion Products), CSA-O<sub>2</sub> (CSA - Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[Purpose of the 15-min activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements. CSA-CP sensors (and readings) employed in the SM were #1051 (21.7%) & #1044 (21.8%); in Node-1 #1058 (20.9%); and in Node-2 #1058 (20.9%). O<sub>2</sub> sensor checks used #1042 (21%), #1063 (21.8%), #1052 (21.8%), #1041 (21.7%). CDMK CO<sub>2</sub> level in Lab and SM was ~0.20%.]*

Peggy and Dan completed their second run with the MedOps WinSCAT (Spaceflight Cognitive Assessment Tool) experiment by logging in on the MEC (Medical Equipment Computer) and performing the psychological evaluation exercise on the laptop-based WinSCAT experiment. *[WinSCAT is a time-constrained questionnaire test of cognitive abilities, routinely performed by astronauts aboard the ISS every 30 days before or after the PHS (periodic health status) test or on special CDR's, crewmembers or flight surgeons request.]*

In the Joint Airlock, the CDR and FE-2 performed more post-EVA cleanup, recharging the EMU/spacesuits with water from PWR (Payload Water Reservoir) #1024 and CWC (Contingency Water Container) #1059, then reconnecting the

LTAs (Lower Torso Assemblies) to the EMUs and capping the UIA (Umbilical Interface Assembly).

Tani also terminated the overnight regeneration of METOX (Metal Oxide) canisters #0017 & #0019 in the A/L bakeout oven and initiated the process on canisters #0020 & #0021. *[METOX CO<sub>2</sub> absorption cans, rather than LiOH (Lithium Hydroxide) filters, were used yesterday both in the Airlock for the Campout and in the two EMUs for the spacewalk.]*

Afterwards, Dan started discharging two EMU batteries, #2063 & #2077, used during EVA-13. *[The full maintenance discharge is handled automatically by an SSC laptop equipped with a special DOS application.]*

Peggy Whitson conducted the weekly 10-min. CWC audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card (16-0018K), to be updated with today's data, lists 26 CWCs; ~983 liters total) for the four types of water identified on board: technical water (735.4 l, for Elektron, flushing, hygiene), potable water (221.3 l), condensate water (0 l), waste/EMU dump and other (26.6 l). Two CWCs (#1004 & #1081, ~89 l) with potable water are off limits due to the Wautersia bacteria found in sample analysis, the source of which is still not understood. Impact of losing this potable CWC is negligible since there are sufficient drinking water supplies onboard. Also currently not to be used are nine CWCs with technical water (~389 l).]*

Peggy unstowed and set up the NUTRITION with Repository hardware for the blood draw and urine collection part of her third session with this experiment, beginning tomorrow with a combination blood draw (Serum & Heparin), requiring Dr. Whitson to forego exercising & food intake for eight hours, i.e., starting tonight. Urine sample collection begins tomorrow morning and continues for 24h, i.e., through Tuesday morning. *[The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing in-flight samples (plus an additional postflight sample), made possible by the MELFI (Minus Eighty Degree Celsius Laboratory Freezer for ISS). Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status & nutrient requirements.]*

At ~3:15am EST, Yuri Malenchenko had a PMC (Private Medical Conference) via S-band/audio to discuss his exercise regimen.

The crewmembers performed their regular 2.5-hr physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, the CDR copied the exercise data file to the MEC laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

FE-2 Tani conducted the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists among else of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Working from his discretionary “time permitting” task list, Yuri Malenchenko completed the daily IMS (Inventory Management System) maintenance, updating/editing its standard “delta file” including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The relocation of the MT (Mobile Transporter) from WS7 (Worksite 7) to WS4, postponed on 12/14 due to a possible obstruction by MLI (Multi-Layered Insulation) on the NTA (Nitrogen Tank Assembly), was performed at 10:55am-12:55pm, with the Russian MCS (Motion Control System)/thrusters temporarily inhibited due to loads constraints. *[Analysis of the NTA insulation had shown that there was sufficient clearance for the roll-over which has the purpose to provide added protection of the TUS (Trailing Umbilical System) from MMOD (Micrometeoroid/ Orbital Debris) between now and Flight STSA-122/1E. MT will be translated back to WS7 about three days before 1E arrival.]]*

**MBSU Health Flag:** MBSU (Main Bus Switching Unit) 2 is showing a new health flag in a data dump conducted yesterday, indicating an anomaly in one of its firmware blocks. Two other health flags were discovered earlier in different blocks. Exact impacts are unknown until further analysis. All MBSU telemetry appears nominal.

**Progress Launch Preps:** At Baikonur, Kazakhstan, the Progress M-62/27P orbital module was integrated today with the Soyuz-U launch vehicle in the Processing Facility (**see picture, below**).

**Sad Note:** Early this morning it was announced at the MMT (Mission Management

Team) meeting that Flight Engineer Dan Tani's mother Rose died late yesterday during a car crash. Dan was informed in a private phone call. This is the first time an orbiting NASA Astronaut loses a close kin. We all feel truly sorry for your loss, Dan!

CEO photo targets uplinked for today were **Greater Khartoum, Sudan** (*Khartoum and Omdurman, cities at the confluence of the White and Blue Niles, were at nadir and a touch left. The margins of these cities are of greatest interest. Omdurman on the west bank is more earth-colored than Khartoum and thus less easily visible*), **Sahara dust** (*Dynamic event. Conditions have set in for an extended dust event in the central Sahara, north of Lake Chad, in one of the planet's prime dust-generating basins. Dust particles from this basin are now known to reach the Americas several times per year. Looking right for oblique views of the dust plumes and trying to shoot the edges of the dust mass*), **Tunis, Tunisia** (*looking right for this historic port city which lies at the head of a major bay, the crew's main visual cue*), and **Mount Vesuvius, Italy** (*Vesuvius is one of the so-called "Decade Volcanoes". The Decade Volcanoes project focuses on a small number of active volcanoes world-wide in order to encourage a range of research and public-awareness activities, all aimed at improving understanding of volcanoes and the hazards associated with them*).

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**Progress M-62/27P on Soyuz-U in Processing Facility (12/20/07)**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/19/07  
**Date:** Wednesday, December 19, 2007 2:32:49 PM  
**Attachments:**

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## ISS On-Orbit Status 12/19/07

All ISS systems continue to function nominally, except those noted previously or below.

**>>>> Today at ~5:30am EST, the ISS, specifically its FGB module, completed 52,000 orbits of the Earth, having covered a distance of 2.2 billion kilometers (1.37 billion st.miles) in 3316 days. The 19,300 kg (42,600 lbs) Zarya ("Dawn") was launched on a Russian/Khrunichev Proton from Baikonur over nine years ago (11/20/1998) as the first element of the multi-national space station.<<<<**

After wakeup and before breakfast, FE-2 Dan Tani again accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging and completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

For the subsequent METOX (Metal Oxide) CO<sub>2</sub> absorption canister regeneration, the FE-2 connected the regular ITCS LTL (Internal Thermal Control System/Low Temperature Loop) coolant jumper to the LAB1D6 rack, to support the ground-commanded activation of the U.S. CDRA (Carbon Dioxide Removal Assembly), and Houston lowered the temperature setpoint to the regular 9.4 degC. *[CDRA activation was performed from 4:30-5:30am.]*

As part of post-EVA cleanup activities, FE-1 Yuri Malenchenko recorded the "Pille" radiation readings from the EMU-worn (plus one background) "Pille-MKS" dosimeters in a log table for subsequent downlink to the ground.

Other cleanup activities performed by Dan Tani during the day were –

- Disconnecting the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cables at the Lab RWS (Robotics Work Stations), used during the EVA for SSRMS (Space Station Remote Manipulator System) video coverage,
- Powering down the no-longer-needed A31p PCS (Portable Computer System) laptop in the Airlock (A/L), and
- Initiating and monitoring regeneration of METOX canisters #0017 & #0019 in the A/L bakeout oven.

At ~8:25am EST, the three crewmembers wrapped up post-EVA activities by discussing the spacewalk in the usual post-EVA debriefing conference with the ground via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplink on the SSC-10 laptop).

In the Lab, after inspecting, activating and configuring the MSG (Microgravity Science Glovebox) facility, CDR Peggy Whitson initiated another series of vacuum draws on the sample chamber containing SPU-11 (Sample Processing Unit #11), by opening the vent and vacuum valves, for subsequent CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment ops on its third run, to be controlled by the ground for the next 36 hrs (until 12/22). *[CSLM-2 examines the kinetics of competitive particle growth within a liquid matrix. During this process, small particles shrink by losing atoms to larger particles, causing the larger particles to grow (coarsen) within a liquid lead/tin matrix. This study defined the mechanisms and rates of coarsening that govern the manufacture with metals from turbine blades to dental amalgam fillings.]*

In Node-2, the FE-2 restored the BCAT-3 (Binary Colloidal Alloy Test-3) science payload in the MWA WSA (Maintenance Work Area/Work Surface Area) to nominal operation by setting up Sample 3 and reinstalling the DCS-760 digital still camera, run by an A31p SSC (Station Support Computer) with EarthKAM software for automatically taking flash photography of the sample every two hours over the next several days. Dan checked on correct focus and flash settings, taking manual photos for ground analysis. *[The EarthKAM DCS 760 had been temporarily removed on 12/16 for being used for yesterday's EVA.]*

FE-1 Malenchenko took the periodic readings of cabin air components with the IK0501 GA (gas analyzer) of the SOGS Pressure Control & Atmospheric Monitoring System in the Service Module (SM), *[IK0501 is an automated system for measuring CO<sub>2</sub>, O<sub>2</sub>, and H<sub>2</sub>O in the air as well as the flow rate of the gas being analyzed.]*

The FE-1 performed a one-hour O<sub>2</sub> (oxygen) refresh of the cabin atmosphere from

Progress M-61/26P storage tank, to utilize its gas stores prior to its jettisoning on 12/22.

Also in preparation for 26P undocking, Malenchenko worked an hour in the cargo ship to dismantle and remove the LKT local temperature sensor commutator/switch (TA251MB) of the BITS2-12 onboard telemetry system, along with its PZU-1M ROM (read-only memory) unit, stowing the avionics items on ISS for reuse in a future vehicle.

Yuri and Peggy had two hours each set aside for finishing up stowing discarded equipment and trash in the 26P cargo ship-turned-trash can while keeping track of movements in the IMS (Inventory Management System).

Malenchenko installed and configured the thermostat-controlled science coolers KUBIK-1 & KUBIK-2 in the SM and transferred their stored data via data cable and PCMCIA card to the RSE1 laptop for subsequent downlink to the ground over the BSR-TM payload channel. The KUBIK refrigerators were then deactivated, removed and put back in stowage in the FGB.

Dan Tani today performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists among else of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Working from his discretionary "time permitting" task list, Yuri Malenchenko conducted the daily IMS (Inventory Management System) maintenance, updating/editing its standard "delta file" including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers performed their regular 2.5-hr physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, the FE-2 copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~1:25pm EST, Peggy Whitson and Dan Tani supported two PAO TV interviews of 6 minutes each, one with CBS News (Bill Harwood), the other with ABC News (Victor Ratner). Afterwards, the CDR downlinked a TV message to MCC-H for

taping on the occasion of NASA's upcoming Day of Remembrance, to be broadcast on NASA TV and used at other NASA occasions marking those solemn days. *[NASA's Day of Remembrance, the final Thursday in January (this time 1/31/08), commemorates and honors the fallen heroes of Apollo 1, Challenger and Columbia and all of those who have given their lives in the cause of exploration and discovery. In their memory, flags across the agency will fly at half-staff.]*

*KURS Tests:* After the two pre-docking tests for Progress M-62/27P of the KURS automated rendezvous & docking system on 12/14 & 12/16, two additional tests are being performed today and tomorrow to confirm positive test results. *[Test results for the previously (12/13) failed KURS String 2 subset were nominal, but only after an extended warm-up time for the system (1.5 hrs instead of nominal 30 min). Today's and tomorrow's testing should provide more assurance of adequate functioning for the docking on 12/26 (~3:25am).]*

*MT Translation:* Relocation of the MT (Mobile Transporter) from WS7 (Worksite 7) to WS4, postponed on 12/14 due to a possible obstruction by MLI (Multi-Layered Insulation) on the NTA (Nitrogen Tank Assembly), will take place tomorrow (12/20) at ~10:55am-12:55pm. *[Analysis of the NTA insulation showed that there is sufficient clearance for the roll-over which is intended to provide added protection of the TUS (Trailing Umbilical System) from MMOD (Micrometeoroid/Orbital Debris) between now and Flight STSA-122/1E.]*

*MPEG-2 Testing:* The recent end-to-end testing of analog & digital video transmission & downlinking from the Russian Segment (RS) via the MPEG-2 (Moving Pictures Expert Group 2) encoder and Ku-band in "streaming video" packets over the U.S. OpsLAN has to date yielded results that are unacceptable for ATV1 "Jules Verne" docking. To obtain more data, a repeat of the end-to-end test is planned for tomorrow (~2:00pm) with some modifications, preparatory to using the video linkup during the Progress 26P undocking on 12/21 (Friday).

*Power Management Update:* Yesterday after the EVA-13, DLA-1 (Drive Lock Assembly 1) of the Stbd SARJ (Solar Alpha Rotary Joint) was re-engaged, moded to Directed Position and moved to safe parking at 45 deg. Between 1:37-2:07pm EST, with the SPS (Secondary Power System) temporarily powered down, ground commanding then transferred power loads on the 1A channel to the 4A channel via the MBSUs (Main Bus Switching Units) by means of the SPCH (Seamless Power Channel Handover) technique. This was necessitated by the limited power generation caused by the combination of Stbd SARJ anomalies, BGA 1A trips and the high Sun Beta angle period just ahead. Channel 1A is now in the so-called "parachute mode" as backup to channel 4A which carries the loads. *[SPS was powered up again yesterday at 2:30-2:45pm.]*

*Onboard Work Look-ahead:* The following tasks are being considered for Stage 10A (i.e., between now and 1E): OGS (Oxygen Generation System) activation (from Stage 1E), Regenerative ECLS modification kit, RPCM (Remote Power Controller Module) replacements in cases where RPCs have been open for some time, and R&R (removal & replacement) of ER1 (EXPRESS Rack 1)'s leaky water valve. Over the holidays, the crew will be busy with payloads ops.

CEO photo targets uplinked for today were **Walvis Bay dunes, Namibia** (*Dynamic event. Viewing conditions improve as winter coastal fog is reduced with the onset of southern spring. Fast-moving dunes [meters per year] on the Namibian coast leave tracks ["footprints"] that are thought to be analogs for hard-to-interpret features seen in many Mars impact craters. A mapping pass on the inshore margin of the small fishing port of Walvis Bay, where these features are known, was requested. Sun angles were ideal*), **Addis Ababa, Ethiopia** (*Addis is seldom clear of cloud cover. The city has a population of more than 3 million. As the capital of Ethiopia and home of the African Union, it has communities representing 80 nationalities. It is growing fast, and CEO observers requested images of the urban fringe where change is focused*), and **Chari River Basin, Chad** (*Dynamic event. The imaging window between summer cloud and winter smoke haze in the Sahel allows documentation of the complex landscape south of Lake Chad. Major rivers are depositing sediment in the form of several very large fanlike features, both active and inactive. The active fans change constantly. ISS/CEO imagery helps understand these changes. A mapping pass along track at nadir and a touch left, was requested. Recent research suggests that the huge sediment fans may be a good analog for some rock units on Mars*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:09am EST [= epoch]):

Mean altitude -- 336.7 km

Apogee height -- 337.3 km

Perigee height -- 336.1 km

Period -- 91.27 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0000896

Solar Beta Angle -- -42.9 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 24 hours -- 130 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 52001

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

NET = Not Earlier Than):

- 12/21/07 -- Progress M-61/26P undocking (DC1) ~10:59pm (to continue free-flying mission)
- 12/22/07 -- Yuri Malenchenko's Birthday
- 12/23/07 -- Progress M-62/27P launch; ~2:12am
- 12/26/07 -- Progress M-62/27P docking (DC1); ~3:25am
- 01/10/08 -- NET: STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.
- 01/12/08 -- NET: STS-122/Atlantis/1E docking
- 01/21/08 -- NET: STS-122/Atlantis/1E undocking
- 01/31/08 -- **Explorer-1 50 Years (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [*Check it out at <http://usspace50.com>*]
- 02/06/08 -- Progress M-62/27P undocking & reentry
- 02/07/08 -- Progress M-63/28P launch
- 02/09/08 -- Progress M-63/28P docking (DC1)
- 02/14/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)
- 02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS
- 02/16/08 -- STS-123/Endeavour/1J/A docking
- 02/27/08 -- STS-123/Endeavour undocking
- 02/29/08 -- STS-123/Endeavour landing
- 03/06/08 -- NET: ATV-1 docking (SM aft port)
- 04/07/08 -- Progress M-63/28P undocking (DC1) & reentry
- 04/08/08 -- Soyuz TMA-12/16S launch
- 04/10/08 -- Soyuz TMA-12/16S docking (DC1)
- 04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)
- 04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)
- 04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS
- 04/26/08 -- STS-124/Discovery/1J docking
- 05/04/08 -- STS-124/Discovery/1J undocking
- 05/14/08 -- Progress M-64/29P launch
- 05/16/08 -- Progress M-64/29P docking (DC1)
- 08/07/08 -- NET: ATV-1 undocking (from SM aft port)
- 08/12/08 -- Progress M-65/30P launch
- 08/14/08 -- Progress M-65/30P docking (SM aft port)
- 09/09/08 -- Progress M-64/29P undocking (from DC1)
- 09/10/08 -- Progress M-66/31P launch
- 09/12/08 -- Progress M-66/31P docking (DC1)
- 09/18/08 -- STS-126/Discovery/ULF2 launch -- MPLM Leonardo, LMC
- 09/20/08 -- STS-126/Discovery/ULF2 docking

10/01/08 -- STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **NASA 50 Years**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/12/08 -- Soyuz TMA-13/17S launch  
10/14/08 -- Soyuz TMA-13/17S docking (SM aft port)  
10/23/08 -- Soyuz TMA-12/16S undocking (FGB nadir)  
11/03/08 -- Soyuz TMA-13/17S relocation (from SM aft to FGB nadir)  
11/06/08 -- STS-119/Discovery/15A launch – S6 truss segment  
11/08/08 -- STS-119/Discovery/15A docking  
11/17/08 -- STS-119/Discovery/15A undocking  
11/20/08 -- **ISS 10 Years**  
11/26/08 -- Progress M-67/32P launch  
11/28/08 -- Progress M-67/32P docking (SM aft port)  
04/15/09 -- **Constellation's Ares I-X Launch**  
05/??/09 -- **Six-person crew on ISS** (following Soyuz 18S-2 docking)  
04/??/10 -- STS-132/Discovery/20A – Node-3 + Cupola.

Note: The daily ISS On-Orbit Status reports can also be found at  
[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/18/07  
**Date:** Tuesday, December 18, 2007 2:07:35 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/18/07**

All ISS systems continue to function nominally, except those noted previously or below.

**EVA-13 by CDR Peggy Whitson & FE-2 Dan Tani was completed successfully** in 6h 56m, accomplishing its objectives.

During the spacewalk, Tani (EV1) & Whitson (EV2), supported by FE-1 Yuri Malenchenko as intravehicular (IV) crewmember, inspected the Stbd (right-side) 1A BGA (Beta Gimbal Assembly) and BMRMM (Bearing Motor Roll Ring Module), followed by a detailed investigation and photo documentation of the Stbd SARJ (Solar Alpha Rotary Joint).

Specifically, the spacewalkers –

- Found no obvious signs of external damage on cables or hardware of the BGA & BMRMM that might have caused the repeated tripping of circuit breakers (RPCs/Remote Power Controllers), making it more likely that the issue is internal to the hardware or its electrical system;
- Entered into the S5 truss to disconnect some wiring to allow the ground to perform diagnostic continuity tests, and later reconnected the cables;
- Temporarily removed 22 protective MLI (Multi-Layer Insulation) covers to inspect the SARJ, its two DLAs (Drive Lock Assemblies), and its 12 TBAs (Trundle Bearing Assemblies), reattaching the covers afterwards,
- Found most metal shavings around TBA-4 and TBA-5, i.e., metallic, magnetic contamination on the main gear bearing's outboard angled race ring as well as pitting and abrasions on the ring but no obvious damage on the inboard race ring or on the gear teeth themselves. DLA (Drive Lock Assembly) #2 appeared especially "ugly", i.e., filled with contamination, and, according to the spacewalkers, the further away from the DLA, the less contamination was observed;
- Took photographs, measured the depth of surface pits with a special probe and collected debris samples; and
- Deinstalled and removed TBA-5 from its housing under cover #20, using a

PGT (Pistol Grip Tool), then brought it inside in a bag for eventual return to Earth aboard STS-122/Atlantis (SARJ can function OK on only 11 TBAs).

*[Official start time of the spacewalk was 4:50am EST, 70 minutes ahead of the timeline, ending at 11:46am. Total EVA duration (PET = Phase Elapsed Time) was 6h 56min. It was the 100<sup>th</sup> spacewalk for ISS assembly & maintenance and the 72<sup>nd</sup> from the station (28 from Shuttle, 50 from Quest, 22 from Pirs) totaling 436h 3m, and the 4<sup>th</sup> for Expedition 16 (totaling 28h 11m. During the spacewalk, her fifth, Peggy Whitson set a new record of aggregated EVA time by a woman (of 32h 36m) when she exceeded the 29h 18m held by Sunita Williams. After today's EVA, a total of 121 spacewalkers (90 NASA astronauts, 21 Russians, and ten astronauts representing Japan-1, Canada-4, France-1, Germany-1 and Sweden-3) have logged a total of 624h 25m outside the station on building, outfitting and servicing. It was also the 122<sup>nd</sup> spacewalk by U.S. astronauts. The 100<sup>th</sup> EVA dedicated to ISS assembly & maintenance originally was to have been conducted by Rex Walheim & Hans Schlegel of the delayed STS-122/1E mission.]*

Prior to the spacewalk, FE-1 Malenchenko verified closure of the protective Lab window shutter.

Malenchenko also completed the pre-egress reconfiguration of the Russian STTS (onboard telephone/telegraph subsystem) to its EVA settings. After the crew's return, Yuri reconfigured the STTS for nominal ops. *[The "Voskhod-M" STTS enables telephone communications between the SM (Service Module), FGB, DC1 Docking Compartment and U.S. segment (USOS), and also with users on the ground over VHF channels selected by an operator at an SM comm panel, via STTS antennas on the SM's outside. There are six comm panels in the SM with pushbuttons for accessing any of three audio channels, plus an intercom channel. Other modes of the STTS include telegraphy (teletype), EVA voice, emergency alarms, Packet/Email, and TORU docking support.]*

During the spacewalk, Yuri provided IV support, prepared the DCS 760 camera setup for post-ingress photographing of the EVA gloves and subsequently assisted the spacewalkers in ingressing, CL (Crew Lock) repressurization and post-EVA activities.

The FE-1 also performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module). *[Regular daily SOZh maintenance consists among else of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

During Campout, after wakeup and before breakfast, FE-2 Dan Tani again

accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging and completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

After returning on board from outside, Whitson and Tani doffed the EMUs, after taking photographs of the gloves and overgloves while still pressurized. As part of post-EVA tasks, the spacewalkers also reported on size fit of their EMUs and components.

Later today, CDR Whitson will downlink the EVA imagery to the ground and reconfigure the DCS 760 for regular use (e.g., removing its thermal blanket).

Afterwards, Peggy and Dan are also scheduled for their regular post-EVA PMCs (Private Medical Conferences) with the ground.

CEO photo target uplinked for today was **Khartoum, Sudan** (*Greater Khartoum [population 8.3 million, 2007 est.] includes Khartoum [2.2 million] in the acute angle between the Blue and White Niles, and Omdurman [3+ million] on the west side of the White Nile. Omdurman is the largest city in the Sudan and the fastest growing, partly because of refugees fleeing western Sudan. The growth of cities, especially in the Third World, is best documented by remote means from the air or space. Looking a touch right for Khartoum and at nadir for Omdurman, shooting city margins).*

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<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

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Mean altitude -- 336.9 km

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Perigee height -- 336.4 km

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Eccentricity -- 0.0000727

Solar Beta Angle -- -38.0 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

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**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

NET = Not Earlier Than):

12/21/07 -- Progress M-61/26P undocking (DC1) ~10:59pm (to continue free-flying mission)

12/22/07 -- Yuri Malenchenko's Birthday

12/23/07 -- Progress M-62/27P launch; ~2:12am

12/26/07 -- Progress M-62/27P docking (DC1); ~3:25am

01/10/08 -- NET: STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.

01/12/08 -- NET: STS-122/Atlantis/1E docking

01/21/08 -- NET: STS-122/Atlantis/1E undocking

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02/06/08 -- Progress M-62/27P undocking & reentry

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking (DC1)

02/14/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour undocking

02/29/08 -- STS-123/Endeavour landing

03/06/08 -- NET: ATV-1 docking (SM aft port)

04/07/08 -- Progress M-63/28P undocking (DC1) & reentry

04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)

04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)

04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS

04/26/08 -- STS-124/Discovery/1J docking

05/04/08 -- STS-124/Discovery/1J undocking

05/14/08 -- Progress M-64/29P launch

05/16/08 -- Progress M-64/29P docking (DC1)

08/07/08 -- NET: ATV-1 undocking (from SM aft port)

08/12/08 -- Progress M-65/30P launch

08/14/08 -- Progress M-65/30P docking (SM aft port)

09/09/08 -- Progress M-64/29P undocking (from DC1)

09/10/08 -- Progress M-66/31P launch

09/12/08 -- Progress M-66/31P docking (DC1)  
09/18/08 -- STS-126/Discovery/ULF2 launch – MPLM Leonardo, LMC  
09/20/08 -- STS-126/Discovery/ULF2 docking  
10/01/08 -- STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **NASA 50 Years**  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/17/07  
**Date:** Monday, December 17, 2007 12:39:51 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/17/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 9 of Increment 16.*

After wakeup and before breakfast, FE-2 Dan Tani again accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging and completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

In preparation for Progress M-62/27P arrival on 12/26 at the DC1 Docking Compartment, Malenchenko and Whitson supported a ground-controlled functions test of the SM (Service Module) & Progress TORU telemanipulator system without Progress DPO thrusters firing. *[Commands were entered via the RUO (Rotational Hand Controller) and RUD (Translational Hand Controller), during an RGS (Russian Groundsite) comm pass at 3:22am EST. The TORU teleoperator system provides a manual backup mode to the Progress' KURS automated rendezvous radar system. The two crewmembers will be monitoring the approach and docking of Progress M-62 at the DC1 from the TORU station in the SM.]*

FE-1 Malenchenko set up the pumping equipment and initiated (later closed out) the periodic transfer of urine from 3 EDV-U containers in the SM to the Rodnik BV1 tanks of Progress M-61/26P, adding ~5 L of disinfectant solution. *[Leak checks performed by the crew on 10/8-9 on the membrane (expulsion bladder) of the Progress' Rodnik BV1 tank showed that BV1 appeared unsuitable for liquid waste transfer due to a small leak in the tank's bladder. Last week, TsUP-Moscow learned from the supplier that the bladder is acceptable for urine transfer provided the KN1 bladder expulsion valve is closed during today's pump-over, i.e., no*

*pressure adapter installed on the bladder outlet. Transfers to the BV2 tanks were performed on 10/23 and 11/15.]*

For tomorrow's EVA-13, final preparations by FE-2 Dan Tani & CDR Peggy Whitson today included -

- Reconfiguring two DCS 760 digital still cameras for the spacewalk (leaving them connected to station power for now to conserve batteries),
- Attaching a tie wrap around one camera's flash (to allow visual identification during EVA),
- Setting up 4 batteries in the A/L BSA (Airlock Battery Stowage Assembly) for charging during the prebreathe period and to be installed in the EVA flashes prior to egress,
- Powering down onboard amateur (ham) radio equipment (Kenwood in SM, Ericsson in FGB) to prevent RF (radio frequency) interference with the EMU (Extravehicular Mobility Unit)/spacesuits,
- Preparing the A/L EL (Airlock Equipment Lock) for the Campout & spacewalk,
- Tagging up with ground specialists at ~8:40am EST for reviewing EVA particulars, and
- Undergoing the standard pre-EVA PMC (Private Medical Conference) via S- & Ku-band audio/video.

Also for the spacewalk, FE-1 Malenchenko prepared three Russian "Pille-MKS" radiation dosimeters, recorded their dosages and equipped each of the two EMUs with a radiation sensor, on the outer surface (A0309/CDR & A0310/FE-2). *[A third sensor, A0308, was placed in the SM on the PULT reader for background readings.]*

Dan (EV1) and Peggy (EV2) will begin their "campout" in the A/L with hatch closure and depressurization of the CL (Crewlock) from 14.7 to 10.2 psi at ~2:20-2:50pm, followed by mask prebreathe at ~2:50-4:00pm. Sleep time for the ISS crew begins at 4:30pm. *[For the Campout, METOX (Metal Oxide) canisters #0017 & #0019) have been installed in the A/L for CO<sub>2</sub> control.]*

After the usual hygiene break/with mask prebreathe for Whitson & Tani at ~1:30-2:40am tomorrow morning after spending the night on 10.2 psi campout, the A/L hatch will be closed again by Malenchenko for EVA preps in 10.2 psi, followed by EMU purge (~4:20-4:35am) and prebreathe (~4:35-5:25am). Afterwards, with CL depressurization and EV1/EV2 egress, EVA-13 nominally begins at ~6:00am EST. Yuri will support the spacewalk as IV (Intravehicular) crewmember, keeping tabs with the detailed activity steps and crib sheet.

*[EVA-13 is expected to last about 6h 30m. Its objectives are: (1) Inspection of 1A BGA (Beta Gimbal Assembly) and BMRMM (Bearing Motor Roll Ring Module,*

*“broom”), including assisting fault search by the ground by disconnecting/reconnecting cables and possibly performing an R&R (removal & replacement) of the 1A ECU (Electronic Control Unit) on the S4 truss; (2) inspection and photo documentation of the Stbd SARJ (Solar Alpha Rotary Joint), including temporary removal of protective MLI covers (8 double-wide, 12 single-wide, plus 2 DLA/Drive Lock Assembly covers), debris removal, DLA inspection, finally unbolting (3 bolts) & removing TBA-5 (Trundle Bearing Assembly #5) for return to Earth. **Note:** The A/L repress after crew ingress will use for the first time the new IMV (Intermodular Ventilation) Flange Saver installed by the CDR Whitson in Node-1 on 12/5. The new Flange Saver slows the equalization rate between the A/L and the ISS in the event of an emergency-triggered equalization during EVA campout, protecting the crew from possible ear damage due to the rapid pressure increase in the airlock.]*

Malenchenko completed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Working from his discretionary “time permitting” task list, Yuri also handled the daily IMS (Inventory Management System) maintenance, updating/editing its standard “delta file” including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers performed their regular 2.5-hr physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Dan copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*ITCS Transition:* At ~11:15am, the Lab ITCS (Internal Thermal Control System) was switched by ground commanding from Single LTL (Low Temperature Loop) to Single MTL (Moderate Temperature Loop) to support offloading of power channel 1A for EVA-13, i.e., provide power balance. Transition back to nominal Single LTL will be on 12/19.

*MT Translation:* Relocation of the MT (Mobile Transporter) from WS7 (Worksite 7) to WS4, postponed on 12/14 due to a possible obstruction by MLI (Multi-Layered Insulation) on the NTA (Nitrogen Tank Assembly), has now been rescheduled for

12/20 (Thursday). Analysis of the NTA insulation showed that there is sufficient clearance for the roll-over which is intended to provide added protection of the TUS (Trailing Umbilical System) from MMOD (Micrometeoroid/Orbital Debris) between now and Flight 1E.

*KURS Radar Antenna Test:* The pre-docking test (for Progress M-62/27P) of the KURS automated rendezvous & docking system, performed on 12/13 with off-nominal results for the backup string 2, was repeated on 12/14 & 12/16. After an extended warm-up time for the system (1.5 hrs instead of nominal 30 min), results for string 2 were nominal. Both subsets of the KURS system are now considered ready for the docking, but another test is planned for 12/19-20.

*SVK-1 Air Conditioner Restoration:* As per report by Moscow this morning at the MMT (Mission Management Team), the Russian air conditioner SKV-1, long nonfunctional due to a blocked line 3 of the BRPK's membrane tank, is now back in service.

No CEO photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 4:35am EST [= epoch]):

Mean altitude -- 337.0 km

Apogee height -- 337.4 km

Perigee height -- 336.5 km

Period -- 91.27 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0000687

Solar Beta Angle -- -33.1 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 24 hours -- 100m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51967

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

NET = Not Earlier Than):

12/18/07 -- Stage 10A EVA (Whitson/Tani) -- Stbd SARJ, 1A BGA BMRRM;  
(~6:00am)

12/18/07 -- STS-122/Atlantis ET tanking test (7:00am)  
12/22/07 -- Yuri Malenchenko's Birthday  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/10/08 -- NET: STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.  
01/12/08 -- NET: STS-122/Atlantis/1E docking  
01/21/08 -- NET: STS-122/Atlantis/1E undocking  
01/31/08 -- **Explorer-1 50 Years (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com>]  
02/06/08 -- Progress M-62/27P undocking & reentry  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking (DC1)  
02/14/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/06/08 -- NET: ATV-1 docking (SM aft port)  
04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
08/07/08 -- NET: ATV-1 undocking (from SM aft port)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/09/08 -- Progress M-64/29P undocking (from DC1)  
09/10/08 -- Progress M-66/31P launch  
09/12/08 -- Progress M-66/31P docking (DC1)  
09/18/08 -- STS-126/Discovery/ULF2 launch – MPLM Leonardo, LMC  
09/20/08 -- STS-126/Discovery/ULF2 docking  
10/01/08 -- STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **NASA 50 Years**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/12/08 -- Soyuz TMA-13/17S launch  
10/14/08 -- Soyuz TMA-13/17S docking (SM aft port)

10/23/08 -- Soyuz TMA-12/16S undocking (FGB nadir)  
11/03/08 -- Soyuz TMA-13/17S relocation (from SM aft to FGB nadir)  
11/06/08 -- STS-119/Discovery/15A launch – S6 truss segment  
11/08/08 -- STS-119/Discovery/15A docking  
11/17/08 -- STS-119/Discovery/15A undocking  
11/20/08 -- **ISS 10 Years**  
11/26/08 -- Progress M-67/32P launch  
11/28/08 -- Progress M-67/32P docking (SM aft port)  
04/15/09 -- **Constellation's Ares I-X Launch**  
05/??/09 -- **Six-person crew on ISS** (following Soyuz 18S-2 docking)  
04/??/10 -- STS-132/Discovery/20A – Node-3 + Cupola.

Note: The daily ISS On-Orbit Status reports can also be found at  
[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/16/07  
**Date:** Sunday, December 16, 2007 1:52:12 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/16/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – EVA Preparation Day 1 for CDR Whitson, FE-1 Malenchenko and FE-2 Tani. Ahead: Week 9 of Increment 16.*

After wakeup and before breakfast, FE-2 Dan Tani again accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging and completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

The crew began preparations for the spacewalk (EVA-13) on 12/18 (Tuesday), starting with FE-2 Dan Tani printing out uplinked EVA procedures/timeline material which was then reviewed jointly by all crewmembers (covering SARJ overview, BGA inspection, updated EVA-13 procedures and the usual EVA crib sheet with contingency actions). *[The spacewalk, scheduled to begin at approximately 6:00am and to last ~6.5 hrs, has two major objectives: (1) Inspection of 1A BGA (Beta Gimbal Assembly) and BMRMM (Bearing Motor Roll Ring Module, "broom"), including assisting fault search by the ground by disconnecting/reconnecting cables and possibly performing an R&R (removal & replacement) of the 1A ECU (Electronic Control Unit) on the S4 truss; (2) inspection and photo documentation of the Stbd SARJ (Solar Alpha Rotary Joint), including temporary removal of protective MLI covers (8 double-wide, 12 single-wide, plus 2 DLA/Drive Lock Assembly covers), debris removal, DLA inspection, finally unbolting (3 bolts) & removing TBA-5 (Trundle Bearing Assembly #5) for return to Earth.]*

In Node-2, the FE-2 discontinued picture taking on the BCAT-3 (Binary Colloidal Alloy Test-3) science payload and deinstalled the EarthKAM DCS 760 digital still

camera, which will be used for the EVA. The equipment will be returned to BCAT-3 photography on 12/19 after the EVA is complete.

In the course of the day, CDR Peggy Whitson & FE-2 Dan Tani worked in the Airlock (A/L) where they -

- Initiated (later terminated) recharging the EMU (Extravehicular Mobility Unit) batteries and two batteries for the DCS 760 camera;
- Configured the camera for taking outside;
- Prepared EVA tools required for the spacewalk activities;
- Consolidated the contents of two PWRs (Payload Water Reservoirs, #1023 & #1025) in a third PWR #1024, yielding approximately 9 lbs of water (PWR can contain up to 20 lbs), then
- Degassed PWR #1024 and inspected #1005 to degas if necessary (i.e., manually removing gas bubbles to minimize the amount of air introduced into the EMU feedwater tanks);
- Checked out the EMU spacesuits (#3006 for Tani, #1005 for Whitson);
- Resized the EMU that had been modified for 1E/Love;
- Equipped EMU #3006 with its REBA (Rechargeable EVA Battery Assembly) and checked out #1005's already-installed REBA;
- Installed and checked out the METOX (Metal Oxide) CO<sub>2</sub> absorption canisters in the suits, and
- Tagged up with the ground at ~10:05am EST to discuss EVA/timeline particulars.

FE-1 Yuri Malenchenko meanwhile performed a refresh of the cabin atmosphere from Progress M-61/26P section 2 storage tank, to utilize its gas stores prior to its jettisoning on 12/22.

The FE-1 also completed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM). *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers. Weekly SOZh reports (on Sundays) to TsUP/Moscow deal with number & dates of water and urine containers, counter readings of water consumption & urine collection, and total operating time of the POTOK air filtration system.]*

At ~2:30pm, Dan Tani had his weekly PFC (Private Family Conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

The crewmembers performed their regular 2.5-hr physical workout program (about

half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Still on Yuri's "time permitting" job list was the periodic collection & deletion of readings on the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the RBO-3-2 Matryoshka-R anthropomorphic (human torso) "phantoms" located inside the station for sophisticated radiation studies, collecting radiation measurements every 15 minutes around the clock.

A second job item on the FE-1's discretionary list for today was another KPT-3 session to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON) using the Nikon D1X digital camera with SIGMA 300-800mm telephoto lens. *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

Also on the voluntary task list for Yuri was a late-added session of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D2X digital camera with 800 mm focal length lenses to take pictures of the Kerch Strait at low sun angle to record an oil spill, the aftermath of a ship wreck in the strait during a recent hurricane. *[According to media report an oil spill covering several kilometers was spotted on 12/4. Also a target region for Uragan photography for today were glaciers of northern and southern islands of New Zealand in nadir.]*

No CEO photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:25am EST [= epoch]):

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Perigee height -- 336.4 km

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Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0000922

Solar Beta Angle -- -28.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 24 hours -- 124m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 51954

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

NET = Not Earlier Than):

- 12/18/07 -- Stage 10A EVA (Whitson/Tani) -- Stbd SARJ, 1A BGA BMRRM;  
(~6:00am)
- 12/18/07 -- STS-122/Atlantis ET tanking test (7:00am)
- 12/22/07 -- Yuri Malenchenko's Birthday
- 12/22/07 -- Progress M-61/26P undocking (DC1) & reentry
- 12/23/07 -- Progress M-62/27P launch
- 12/26/07 -- Progress M-62/27P docking (DC1)
- 01/10/08 -- NET: STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.
- 01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]
- 02/07/08 -- Progress M-63/28P launch
- 02/09/08 -- Progress M-63/28P docking
- 02/14/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)
- 02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS
- 02/16/08 -- STS-123/Endeavour/1J/A docking
- 02/27/08 -- STS-123/Endeavour undocking
- 02/29/08 -- STS-123/Endeavour landing
- 03/01/08 -- Progress M-62/27P undocking (DC1) & reentry
- 03/06/08 -- NET: ATV-1 docking (SM aft port)
- 04/07/08 -- Progress M-63/28P undocking (DC1) & reentry
- 04/08/08 -- Soyuz TMA-12/16S launch
- 04/10/08 -- Soyuz TMA-12/16S docking (DC1)
- 04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)
- 04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)
- 04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.
- 04/26/08 -- STS-124/Discovery/1J docking
- 05/04/08 -- STS-124/Discovery/1J undocking
- 05/14/08 -- Progress M-64/29P launch
- 05/16/08 -- Progress M-64/29P docking (DC1)
- 07/29/08 -- NET: ATV-1 undocking (from SM aft port)
- 08/11/08 -- Progress M-64/29P undocking (from DC1)
- 08/12/08 -- Progress M-65/30P launch
- 08/14/08 -- Progress M-65/30P docking (SM aft port)
- 09/13/08 -- Progress M-66/31P launch
- 09/15/08 -- Progress M-66/31P docking (DC1)
- 09/18/08 -- STS-126/Discovery/ULF2 launch -- MPLM Leonardo, LMC
- 09/29/08 -- STS-126/Discovery/ULF2 undocking.

10/01/08 -- **50<sup>th</sup> Birthday of NASA**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
11/06/08 -- STS-119/Discovery/15A launch – S6 truss segment  
04/??/09 -- **Six-person crew on ISS** (with Soyuz 18S docking)  
04/15/09 -- **Constellation's Ares I-X Launch**  
04/??/10 -- STS-132/Discovery/20A – Node-3 + Cupola.

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/15/07  
**Date:** Saturday, December 15, 2007 1:11:50 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/15/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- off-duty day for CDR Whitson, FE-1 Malenchenko and FE-2 Tani except for housekeeping and voluntary work.*

After wakeup and before breakfast, FE-2 Dan Tani again accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging and completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

In the Lab, FE-2 Dan Tani wrapped up his support of the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment in the MSG (Microgravity Science Glovebox) facility, terminating SPU-3 (Sample Processing Unit #3) processing, transferring its data to the MLC (MSG Laptop Computer) and verifying them, then removing SPU-3, installing a new SPU (#11), and finally turning the payload off. Later, the MSG was also powered off. *[CSLM-2 examines the kinetics of competitive particle growth within a liquid matrix. During this process, small particles shrink by losing atoms to larger particles, causing the larger particles to grow (coarsen) within a*

*liquid lead/tin matrix. This study defined the mechanisms and rates of coarsening that govern the manufacture with metals from turbine blades to dental amalgam fillings. By all indications, the CSLM runs were nominal.]*

In Node-2, with the BCAT-3 (Binary Colloidal Alloy Test-3) science payload running by itself since 12/13, the FE-2 performed his daily status check on the A31p laptop controlling the EarthKAM digital still camera, verifying on the last image taken that image focus and alignment remain in check. *[The SSC (Station Support Computer) is taking photography of the phase separation occurring in the BCAT Sample 3, with the photo flash going off every half hour for the next few days. The EarthKAM camera will be required next week for post-EVA EMU glove photography.]*

FE-1 Yuri Malenchenko performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

At ~6:35am EST, the FE-1 had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

At ~9:15am, the crewmembers held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners) via S-band/audio, reviewing the monthly calendar, upcoming activities, and any concerns about future on-orbit events.

The crewmembers performed their regular 2.5-hr physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Peggy copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

A new task added to the voluntary "job jar" list for CDR and FE-2 calls for finishing up the audit and consolidation of photo/TV items in their CTBs (Cargo Transfer Bags), started by Dan Tani yesterday.

Also in the discretionary “job jar” for Dan for today were departure preparations for his end-of-increment cleanup. *[Due to the extension of his station tenure to NET mid-January, the FE-2 will have more leisure in completing this clean-up.]*

Working from his own “time permitting” job list, Yuri was to perform the periodic collection & deletion of readings on the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the RBO-3-2 Matryoshka-R anthropomorphic (human torso) "phantoms" located inside the station for sophisticated radiation studies, collecting radiation measurements every 15 minutes around the clock.

A second job item on Malenchenko’s discretionary list for today was another KPT-3 session to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON) using the Nikon D1X digital camera with SIGMA 300-800mm telephoto lens. *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

*MT Translation:* Yesterday’s planned MT (Mobile Transporter) translation from WS7 (Worksite 7) to WS4, erroneously reported here as completed, was deferred to no earlier than 12/20 (Thursday) due to a possible obstruction of MLI (Multi-Layered Insulation) on the NTA (Nitrogen Tank Assembly). The translation will provide added protection of the TUS (Trailing Umbilical System) from MMOD (Micrometeoroid/Orbital Debris) between now and Flight 1E. Ground controllers are assessing imagery of the translation path and developing a forward plan.

*BGA 1A Update:* More testing was performed last night on the failed 1A BGA (Beta Gimbal Assembly). During a power switch sequence the BCDU 3A1 CP RBI (Battery Charge/Discharge Unit/CP Remote Bus Isolator), a fuse-type switch, did not trip open, but the RPCs (Remote Power Controllers) of both primary and redundant power feeds to the 1A ECU (Electronics Control Unit) tripped several times. At the conclusion of the test, the RPCs remained closed for about 3 hours, then tripped again. ECU 1A is now unpowered and BGA 1A is locked, with the motor off, i.e., in stable configuration. Engineering analysis of the dumped data continues, but no more troubleshooting is expected before the EVA-13.

### **Weekly Science Update** (Expedition Sixteen -- Week 8)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Radiation measurements continue nominally in the PIRS module. The next memory card replacement activity is currently scheduled on 12/10.

*ANITA:* Completed.

*BCAT (Binary Colloidal Alloy Test):* The Binary Colloidal Alloy Test-3 experiment can now proceed, thanks to Astronauts Dr. Peggy Whitson and Dan Tani. Sample 3, the most critical of the samples (and the one closest to the critical point) was the first to be restarted to allow for the publication of the science data by Harvard University (Dr. David Weitz, PI, and Peter Lu, Doctorate Candidate). Operations (EarthKAM imaging) will continue for 4 days when parts of the BCAT-3 setup is needed for EVA activities. After the EVA BCAT-3 activities will continue for a total of 14 days.

*CARDIOCOG-2:* Completed.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS):* “Dan: Due to the slip of 1E, we will need to repeat your 2<sup>nd</sup> session at the appropriate time frame (within R-21 to R-14) to meet the experiment’s requirements. This activity will be hard scheduled. Again, thank you for your participation.”

*CFE (Capillary Flow Experiment):* Reserve.

*CSI-2/CGBA (CGBA Science Insert #2/Commercial Generic Bioprocessing Apparatus):* In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* Complete.

*CSLM-2 (Coarsening in Solid-Liquid Mixtures 2):* CSLM-2 SPU-3 34-hr soak is in progress and should be complete by 12/15/07.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Complete.

*EPO (Educational Payload Operations):* EPO is very satisfied with the EPO Demos that the crew conducted within the past week including the *Sanitation on Station, ISS Tour / Living Space, and Newton's Laws Demo*. The videos will be used to enhance existing education resources. “We would like to thank the crew for their efforts in inspiring the next generation of explorers in science, technology, engineering, and mathematics.”

*ETD (Eye Tracking Device):* Second session for Yuri Malenchenko was performed nominally on 12/12.

*Integrated Immune:* In progress.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* MULTIGEN-1 samples will be downloaded on STS-122 (1E). Peggy performed successfully the Water Reservoirs Exchange activity on 12/12. That allows for additional dry-out of the EMCS (European Modular Cultivation System) Facility as preventive measure to the now delayed Clean-Up activities planned during 1E Stage..

*MSG-SAME (Microgravity Science Glovebox):* Complete.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION/REPOSITORY:* In progress..

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* "Peggy: The Sleep PI appreciates you going "above and beyond" with your extra sleep logging. Remaining for the Sleep experiment, you have monthly downloads, doffing the Actiwatch, and two more weeks of required sleep logging." "Dan: The Sleep team would appreciate if you could continue to sleep log so that the Sleep experiment's logging requirements (3 weeks during the mission) are met."

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* In progress. To be conducted tomorrow (12/2).

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observation):* On-going.

CEO photo targets uplinked for today were Afar Rift Zone, Ethiopia (*looking to the right of track as ISS approached the "elbow" formed by the Red Sea and Gulf of Aden - the area to the west of the elbow is the Afar Rift Zone [also known as the Afar Triangle]. This geologically active region is a junction between the Arabian, Indian, and African tectonic plates - all of which are moving away from each other,*

*producing frequent earthquakes and historically active volcanoes [such as Erta Ale in Ethiopia]. Overlapping frames of the Afar Triangle area will provide a useful record of the rift area, particularly surface expressions of faults and lava flows), and Madrean Sky Islands (this target is located in the northern reaches of Mexico's Sierra Madre Occidental which boast some of the richest biodiversity anywhere in North America. It is comprised of cool, moist, higher-altitude pine-oak forested mountain ranges that dot the hot, lower Sonoran and Chihuahuan deserts of southern Arizona and New Mexico and northwestern Mexico. These climatological islands are situated in remote and rugged areas and are vestiges of cooler, wetter periods during the ice ages. Nadir- or near-nadir imagery of the forested mountaintops was requested).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

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(~6:00am)

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12/22/07 -- Yuri Malenchenko's Birthday

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12/23/07 -- Progress M-62/27P launch

12/26/07 -- Progress M-62/27P docking (DC1)

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01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone**

**rocket)** [Check it out at <http://usspace50.com/>]

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/14/07  
**Date:** Friday, December 14, 2007 2:42:11 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/14/07**

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After wakeup and before breakfast, FE-2 Dan Tani again accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging and completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

Also upon wakeup, FE-1 Yuri Malenchenko terminated his fourth MBI-12 SONOKARD experiment session by taking the recording device from his SONOKARD sports shirt pocket and later copying the measurements to the RSE-MED laptop for subsequent downlink to the ground. *[SONOKARD objectives are stated to (1) study the feasibility of obtaining the maximum of data through computer processing of records obtained overnight, (2) systematically record the crewmember's physiological functions during sleep, (3) study the feasibility of obtaining real-time crew health data. Investigators believe that contactless acquisition of cardiorespiratory data over the night period could serve as a basis for developing efficient criteria for evaluating and predicting adaptive capability of human body in long-duration space flight.]*

The FE-2 again activated the VDS MPC (Video Distribution System/Multi-Purpose Converter) with its four downlinks to allow the ground to conduct HDTV (high-definition TV) playback and downlink operations. Later today (~1:40pm EST), the MPC was powered off again.

Tani then assisted the ground in ongoing troubleshooting of the transmission &

downlinking of analog (as opposed to digital) video signals from the Russian Segment (RS) via the MPEG-2 (Moving Pictures Expert Group 2) encoder and Ku-band in "streaming video" packets over the U.S. OpsLAN. *[Prior end-to-end video test results had not been as expected, and the evaluation of downlinked log files continues. For today's troubleshooting, Tani set up the software application for PAL (Russian)-to-NTSC (US) format conversion on an A31p laptop, connected cables and started the laptop. After the test, the A31p was left on for eventual downlinking of more log files.]*

Malenchenko completed the periodic switchover of the Russian STTS telephone/telegraph subsystem to an alternate string, today to the primary string after its operation on the backup string. *[The "Voskhod-M" STTS enables telephone communications between the SM, FGB, DC1 and U.S. segment (USOS), and also with users on the ground over VHF channels selected by an operator at an SM comm panel, via STTS antennas on the SM's outside. There are six comm panels in the SM with pushbuttons for accessing any of three audio channels, plus an intercom channel. Other modes of the STTS include telegraphy (teletype), EVA voice, emergency alarms, Packet/Email, and TORU docking support.]*

Dan Tani had about 4 hrs scheduled for auditing and consolidating photo/TV items in their CTBs (Cargo Transfer Bags), including a large number of size AA batteries. *[This task has up to now been on the U.S. "job jar" task list for Dan and Peggy and was now hard scheduled due to crewtime availability.]*

The CDR and FE-2 conducted a one-hour review of an uplinked procedures briefing package for the US EVA-13 next week (12/18), covering topics like egress plan, timeline ordering of tasks, translation/fairleads/tether plan, hazards, and ingress plan. Later (~7:00am EST) Peggy and Dan tagged up with ground specialists to discuss particulars. *[The spacewalk of ~6.5 hrs duration has two major objectives: (1) Inspection of 1A BGA (Beta Gimbal Assembly) and BMRMM (Bearing Motor Roll Ring Module, "broom"), including assisting fault search by the ground by disconnecting/reconnecting cables and possibly performing an R&R (removal & replacement) of the 1A ECU (Electronic Control Unit) on the S4 truss; (2) inspection and photo documentation of the Stbd SARJ (Solar Alpha Rotary Joint), including temporary removal of protective MLI covers (8 double-wide, 12 single-wide, plus 2 DLA/Drive Lock Assembly covers), debris removal, DLA inspection, finally unbolting (3 bolts) & removing TBA-5 (Trundle Bearing Assembly #5) for return to Earth.]*

The FE-1 meanwhile worked in the RS on the line 3 BRPK-2 Air/Liquid Condensate Separator of the SRV-K2M Condensate Water Recovery System, removing the mechanical filter cartridge from the separator's transfer unit.

Whitson took air samples for the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[Purpose of the 15-min activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements. O<sub>2</sub> sensors checks used #1042, #1063, #1052, #1041. CO<sub>2</sub> sensors used are #1013, #1058, #1045. CO<sub>2</sub> level in Lab and SM was ~0.44%.]*

With the BCAT-3 (Binary Colloidal Alloy Test-3) science payload running by itself in Node-2 since yesterday, FE-2 Tani began a daily status check on the A31p laptop controlling the EarthKAM digital still camera, verifying on the last image taken that image focus and alignment remain in check. *[The SSC (Station Support Computer) is taking photography of the phase separation occurring in the BCAT Sample 3, with the photo flash going off every half hour for the next few days.]*

Yuri handled the daily IMS maintenance, updating/editing its standard “delta file” including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Peggy and Yuri each had another ~4.5 hrs reserved for stowing U.S. and Russian trash cargo on the Progress 26P cargo ship-turned-trash can, currently docked at the DC-1 nadir port. *[Discarded hardware, as specified on uplinked lists, includes such items as Russian food containers (U.S. food containers being recycled on the ground), food waste bags, Penguin-3 suits, TVIS malfunction kit & harnesses, payload containers, one old 760XD laptop, socks, coveralls, wipes & wet towels, medical kits, used & expired alkaline batteries, 35-mm film cassettes, hoses & adapters, cartridge belts with tools, foam pieces, etc.]*

Dan conducted the periodic (every two weeks) 10-min inspection of the RED (Resistive Exercise Device) canister cords and accessory straps as well as the canister bolts for re-tightening if required.

The crewmembers performed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Peggy copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM

storage medium (done six times a week).

A new task added to the voluntary "job jar" list for the CDR and FE-2 calls for an audit of rubber gloves on board, to report the quantity of available clean room rubber gloves and Nitrile gloves stowed in a CTB and in the ASU toilet facility.

At ~2:30am EST, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~4:00am, Yuri linked up with TsUP stowage specialists via S-band to conduct the weekly IMS tagup, discussing stowage issues and equipment locations.

At ~8:20am, the FE-1 also powered up the SM (Service Module)'s amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), to conduct, at 8:25am, a ham radio exchange with students and faculty at Kursk State Polytechnic University who actively participated in amateur sessions from Kursk, radio expeditions from Sochi (Dagomys) and from the peak of Mt. Elbrus with Expedition 15 Commander Fyodor Yurchikhin.

At ~2:00pm, the crew conducted their sixth weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio. [*S/G-2 (Space-to-Ground 2) phone patch via SSC-10 (Station Support Computer 10)*].

*KURS Antenna Test:* Yesterday, a ground-commanded test of the KURS system was performed over RGS (Russian Ground Sites) from the DC1 Docking Compartment side in preparation for Progress M-62/27P docking on 12/26. Test results for string 1 of the KURS hardware were nominal, but results for string 2 were off-nominal. Specialists at TsUP-Moscow believe the off-nominal results may be due to a loss of VHF (Very High Frequency)-1 communication and the telemetry stream from RGS 27 (BRL). TsUP will decide if a retest on string 2 is required.

*TORU Test:* In preparation for 27P arrival, Moscow has scheduled a test of the TORU manual teleoperator control system in the SM for 12/17.

*26P Rodnik Tank:* Since 9/4, the expulsion bladder in Progress 26P's Rodnik tank 1 has been suspected of a small leak, possibly rendering the tank unfit for the upcoming urine transfer from the SM. TsUP this week learned from the supplier that the bladder is acceptable for urine transfer provided the KN1 valve is closed during the pump-over, currently scheduled for 12/17 (Monday).

*MT Translation:* At 11:41am-1:41pm the MT (Mobile Transporter) was remotely driven from WS7 (Worksite 7) to WS4, in order to protect the MT TUS (Trailing

Umbilical System) cable from MMOD (micrometeoroid/orbital debris) damage. *[In pre-configuring the RS systems for the thruster-disabled period during the translation (to reduce loads), a software program uplinked was inadvertently executed, configuring the Russian SUDN (Motion Control & Navigation System) such that both it and the U.S. GNC (Guidance, Navigation & Control) systems were briefly in control of ISS attitude. Action to reconfigure into a structurally safe mode was taken immediately. The rail cart will be returned to WS4 shortly before 1E arrival. Before the translation, the rail path was surveyed with the SSRMS (Space Station Remote Manipulator System) vidcams for obstructions.]*

CEO (Crew Earth Observation) photo targets uplinked for today were **Somalia Coast, Somalia** (weather was predicted to be clear over Somalia for photography of coastal dune and vegetation patterns. Collection of baseline imagery during the current La Nina conditions will be useful for comparison with the next El Nino event. Looking to the right of track as ISS proceeded NE parallel to the coastline; overlapping, along-track frames were recommended), and **Gulf of Fonseca, Honduras** (scattered clouds were predicted over the Gulf of Fonseca, but there should have been opportunities for mapping photography of the site. Overlapping frames of the coastline were requested. Repeat imagery of the site will allow for assessment of land use and land cover change on the coastal environment over time).

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/13/07  
**Date:** Thursday, December 13, 2007 1:44:56 PM  
**Attachments:**

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All ISS systems continue to function nominally, except those noted previously or below.

After wakeup and before breakfast, FE-2 Dan Tani (whose station tenure has now been extended) again accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging and completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

Also before breakfast, CDR Whitson, FE-1 Malenchenko and FE-2 Tani performed the periodic Russian biomedical routine assessments PZEh-MO-7/Calf Volume Measurement and PZEh-MO-8/Body Mass Measurement (4<sup>th</sup> for CDR & FE-1, 3<sup>rd</sup> for FE-2), using the IM mass measurement device which Malenchenko afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference pints, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

Malenchenko and Whitson, assisting each other in turn, conducted a session with the biomedical protocol KARDIO-ODNT (MBI-5) in the "Chibis" garment, an extensive cardiovascular test of human pericardium (heart muscle) activity as well

as of primary parameters of central and regional blood circulation at rest and under the effect of lower body negative pressure (LBNP, Russian: ODNT). *[The Chibis provides gravity-simulating stress to the body's cardiovascular/circulatory system for evaluation of Yuri's & Peggy's orthostatic tolerance (e.g., the Gauer-Henry reflex) after 7 weeks in zero-G. The MBI-5 protocol again consisted of first imbibing 150-200 milliliters of water or juice, followed by a sequence of progressive regimes of reduced ("negative") pressure, set at -25, -30, -35 and -40 mmHg for five minutes each, while shifting from foot to foot at 10-12 steps per minute. The body's circulatory system interprets the pressure differential between upper and lower body as a gravity-like force pulling the blood and body fluids "down". MBI-5 data output include blood pressure readings with the Tenzoplus Sphygmomanometer, today without telemetry data monitoring but reporting of heart rate and blood pressure to TsUP-Moscow.]*

Later today, at sleeptime, Malenchenko will start another data take with the new Russian MBI-12 SONOKARD (Sonocard) experiment, his fifth. *[During sleep, Yuri will wear a shirt with the special SONOKARD device in the shirt pocket. The objectives of the experiment are stated to (1) study the feasibility of obtaining the maximum of data through computer processing of records obtained overnight, (2) systematically record the crewmember's physiological functions during sleep, (3) study the feasibility of obtaining real-time crew health data. Investigators believe that contactless acquisition of cardiorespiratory data over the night period could serve as a basis for developing efficient criteria for evaluating and predicting adaptive capability of human body in long-duration space flight.]*

After familiarizing himself with the BCAT-3 (Binary Colloidal Alloy Test-3) science payload, Dan Tani supported another session by setting up the MWA WSA (Maintenance Work Area/Work Surface Area) in Node-2 for BCAT Sample 3 operations, including arranging a digital still camera run by an A31p SSC (Station Support Computer) with EarthKAM software for automatically taking flash photography of the sample every two hours over the next several days. *[On crew recommendation, the ground approved moving the payload to Node-2. Thus, BCAT-3 becomes the first science experiment conducted in the new Harmony node!]*

Later, Dan also continued his work on the MSG (Microgravity Science Glovebox) facility, terminating the final (fourth) vacuum draw on the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment and initiating sample processing, to be run by the ground for the next 36 hrs. Dan's next intervention will be on 12/15. *[CSLM-2 examines the kinetics of competitive particle growth within a liquid matrix. During this process, small particles shrink by losing atoms to larger particles, causing the larger particles to grow (coarsen) within a liquid lead/tin matrix. This study defined the mechanisms and rates of coarsening that govern the manufacture with metals*

*from turbine blades to dental amalgam fillings.]*

CDR Whitson contributed to the current round of the monthly preventive maintenance of Russian segment (RS) ventilation systems, working in the FGB (Funktsionalnyi-Grusovoi Blok) to clean the detachable VT7 fan screens 1, 2, and 3 of the three SOTR (Thermal Control System) gas-liquid heat exchangers (GZhT4).

Yuri Malenchenko continued the extended leak checking of the spare BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator by checking the unit's pressure and charging it once again with pressurized N<sub>2</sub> from the BPA-M Nitrogen Purge Unit (#23) to 1 atm (1 kg/cm<sup>2</sup>). The last test pressurization was on 11/12. *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

Dan Tani serviced the CSA-CP (Compound Specific Analyzer-Combustion Products) primary unit (#1051) by changing out its battery after turning it off first.

The FE-2 also filled out the regular FFQ (Food Frequency Questionnaire), his 6<sup>th</sup>, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. At TsUP/Moscow, food specialists are currently preparing the Russian food "menu" for delivery by Progress M-63/28P next February. 28P will carry "bonus food" for Peggy and Yuri, plus about 15 kg of fresh food items (apples, grapefruit, oranges, lemons, garlic) in two containers.]*

Peggy Whitson conducted the weekly 10-min. CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card (16-0018J), to be updated with today's data, lists 24 CWCs; ~1041 liters total) for the four types of water identified on board: technical water (793.6 l, for Elektron, flushing, hygiene), potable water (221.3 l), condensate water (0 l), waste/EMU dump and other (26.6 l). Two CWCs (#1004 & #1081, ~89 l) with potable water are off limits due to the Wautersia bacteria found in sample analysis, the source of which is still not understood. Impact of losing this potable CWC is negligible since there are sufficient drinking water supplies onboard. Also currently not to be used are nine CWCs with technical water (~389 l).]*

Yuri performed the routine servicing of the SOZh system (Environment Control &

Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Later, the FE-1 handled the daily IMS maintenance, updating/editing its standard “delta file” including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Yuri and Dan had another 2 hrs reserved for stowing discarded U.S. cargo on Progress 26P, currently docked at the DC-1 nadir port, for disposal later this month (12/22). *[Discarded hardware, as specified on an uplinked list, includes such items as food containers, food waste bags, Penguin-3 suits, socks, coveralls, wipes & wet towels, medical kits, used & expired alkaline batteries, 35-mm film cassettes, hoses & adapters, cartridge belts with tools, etc.]*

The crewmembers conducted their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Peggy copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~10:10am EST, Peggy, Yuri and Dan supported a 20-min joint crew news conference conducted with U.S. media at NASA centers and NASA Headquarters. *[Media clients tape the event for use within their respective media outlets.]*

At ~11:30am EST, the crew conducted their standard bi-weekly teleconference with the JSC Astronaut Office (Steve Lindsey), via S-band S/G-2 audio & phone patch.

*US EVA-13 Update:* Planning is going ahead on the spacewalk scheduled for Whitson & Tani next Tuesday (12/18) for comprehensive in-situ inspection & photography of (1) the damaged starboard SARJ (Solar Alpha Rotary Joint) and (2) the 1A BGA (Beta Gimbal Assembly) on the S4 truss, particularly its BMRRM (Bearing Motor Roll Ring Module, sometimes pronounced “broom”). *[Background: On 12/8, a currently unknown anomaly (most likely a short) caused a trip of three separate power feeds going through the BMRRM to the BGA ECU (Electronics Control Unit), resulting in loss of redundancy (i.e., the ECU remains powered by the redundant feed; the primary feed is off). To protect for 1E docking, the 1A BGA was then parked at 79 degs and latched. Last night, when the open RPC-1(Remote*

*Power Controller 1) of RPCM (RPC Module) 1A A was commanded closed as a test, both it and the second RPCM feeding BGA 1A tripped open, indicating a short either upstream of the BMRRM (such as in the IEA/Integrated Equipment Assembly wiring, i.e., cables W05 & W06) or the BMRRM and downstream wiring (ECU or BGA platform). In addition to visual inspection, the spacewalkers will have to disconnect and reconnect connectors for the ground to isolate a short. Appropriate power inhibits will safe the connectors beforehand.]*

*ATU-15 Recovery Update: Troubleshooting of the portside ATU-15 (Audio Terminal Unit 15) in Node-2 by CDR Whitson on 12/12 succeeded in restoring the unit to function. The fault was found to be a sticky PTT (Push-to-talk) button. [The ATU will be left in standby and available for use as desired. Ground work is underway to correct the sticking action.]*

*MT Translation: Due to the 1E launch slip, Robotics engineers will translate the MT (Mobile Transporter) tomorrow (12/14; 11:41am-1:41pm) from WS7 (Worksite 7) to WS4, in order to protect the MT TUS (Trailing Umbilical System) cable from MMOD (micrometeoroid/orbital debris) damage. The rail cart will be returned to WS4 on or about 1/2/08 in time for 1E arrival. [Before the translation, the rail path will be surveyed with the SSRMS (Space Station Remote Manipulator System) vidcams for obstructions. RS thrusters will be disabled for the duration of the MT translation.]*

*STS-122 Tanking Test: The comprehensive ECO (Engine Cut-Off) sensor system test being prepared for 12/18 (7:00am EST), will take the External Tank (ET) through a nominal thermal/cryo cycle, i.e., LH<sub>2</sub> tanking/detanking. Background:*

*Employing the real-time TDR (Time Domain Reflectometry) method commonly used for locating faults in very long cable lines (e.g., twisted wire pairs, coaxial cables for telecommunications, surveillance [e.g., checking for wire taps], microcircuits, optical fibers, etc.), an electronic instrument sends out a fast-rise-time electrical pulse which either will be absorbed at the other end if there is no break in resistance (impedance), or reflected back in various ways depending on the discontinuity (break) in resistance encountered. From the known travel time of the pulse-and-echo, the location of the fault can be located to within centimeters. The breakpoints in the cabling for introducing the TDR pulse are being set up inside the MLP (Mobile Launch Platform) on the pad without any changes to any connectors, feedthroughs, cabling trays etc. in the ET and Orbiter from their nominal state.*

*CEO (Crew Earth Observation) photo targets uplinked for today were **Arkenu 1 and Arkenu 2 Impact Craters** (ISS had a nadir pass over the paired Arkenu 1 [7 km diameter] and 2 [10 km diameter] impact craters. Both craters formed approximately 140 million years ago during impact of the same meteor. Looking for*

*the circular crater structure formed by dark rocks - contrast is high with the surrounding desert. Nadir, overlapping mapping frames taken along-track were recommended), **Tin Bider Impact Crater** (this approximately 70 million year old impact structure is located in a range of mountains to the south and west of two major North African dune fields. The crater is 6 km in diameter, and the concentric ring structure of disturbed rock layers should be clearly visible with the long lens.*

*Overlapping, nadir mapping frames taken along track were recommended), and **Pilcomayo River Dynamics, Northern Argentina** (weather was predicted to be clear over the inland delta [aka megafan] of the Pilcomayo River. Of particular interest are the branching channels and wetlands of the Pilcomayo megafan. Nadir mapping frames along track are requested to capture imagery of the current channel configuration).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 3:49am EST [= epoch]):

Mean altitude -- 337.6 km

Apogee height -- 338.0 km

Perigee height -- 337.1 km

Period -- 91.28 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0000718

Solar Beta Angle -- -13.8 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 265 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51904

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

*NET = Not Earlier Than):*

12/18/07 -- Stage 10A EVA (Whitson/Tani) -- Stbd SARJ, 1A BGA BMRRM

12/18/07 -- STS-122/Atlantis ET tanking test (7:00am)

12/22/07 -- Yuri Malenchenko's Birthday

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/26/07 -- Progress M-62/27P docking (DC1)

01/02/08 -- NET: STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite.

*Launch period opens.*

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour undocking

02/29/08 -- STS-123/Endeavour landing

03/01/08 -- Progress M-62/27P undocking (DC1) & reentry

03/06/08 -- NET: ATV-1 docking (SM aft port)

04/07/08 -- Progress M-63/28P undocking (DC1) & reentry

04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)

04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)

04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.

04/26/08 -- STS-124/Discovery/1J docking

05/04/08 -- STS-124/Discovery/1J undocking

05/14/08 -- Progress M-64/29P launch

05/16/08 -- Progress M-64/29P docking (DC1)

07/29/08 -- NET: ATV-1 undocking (from SM aft port)

08/11/08 -- Progress M-64/29P undocking (from DC1)

08/12/08 -- Progress M-65/30P launch

08/14/08 -- Progress M-65/30P docking (SM aft port)

09/13/08 -- Progress M-66/31P launch

09/15/08 -- Progress M-66/31P docking (DC1)

09/18/08 -- STS-126/Discovery/ULF2 launch – MPLM Leonardo, LMC

09/29/08 -- STS-126/Discovery/ULF2 undocking.

10/01/08 -- **50<sup>th</sup> Birthday of NASA**

10/11/08 -- Progress M-65/30P undocking (from SM aft port)

10/14/08 -- Soyuz TMA-13/17S launch

10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)

11/06/08 -- STS-119/Discovery/15A launch – S6 truss segment

04/??/09 -- **Six-person crew on ISS**

04/15/09 -- **Constellation's Ares I-X Launch**

04/??/10 -- STS-132/Discovery/20A – Node-3 + Cupola.

Note: The daily ISS On-Orbit Status reports can also be found at [http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/12/07  
**Date:** Wednesday, December 12, 2007 2:10:37 PM  
**Attachments:**

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## ISS On-Orbit Status 12/12/07

All ISS systems continue to function nominally, except those noted previously or below.

After wakeup and before breakfast, FE-2 Dan Tani again accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging and completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

After his original troubleshooting (12/6) of the VDS MPC (Video Distribution System/ Multi-Purpose Converter) with its four downlinks, the FE-2 activated the MPC to allow the ground to conduct HDTV (high-definition TV) playback and downlink operations. Later today (~2:00pm EST), the MPC was powered off again.

Also in the Lab, Dan Tani continued his work on the MSG (Microgravity Science Glovebox) facility, terminating the second vacuum draw on the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment, initiating the third draw, then terminating it after six hours and kicking off the final (fourth) overnight vacuum draw. After that, the ground will be ready for sample processing. *[CSLM-2 examines the kinetics of competitive particle growth within a liquid matrix. During this process, small particles shrink by losing atoms to larger particles, causing the larger particles to grow (coarsen) within a liquid lead/tin matrix. This study defined the mechanisms and rates of coarsening that govern the manufacture with metals from turbine blades to dental amalgam fillings.]*

FE-1 Yuri Malenchenko performed his second session of the ETD (Eye Tracking Device) experiment in the DC-1 Docking Module, first installing the target board,

measuring distances and making hardware connections, then calibrating the setup and making the audio recordings of his eye tracking exercises from three different distances (60 cm, 100 cm, 150 cm).

After yesterday's temporary installation of the BUAP (antenna switching control box), Yuri continued the ATV PCE (Automated Transfer Vehicle/Proximity Communications Equipment; Russian: MBRL) testing in the Service Module (SM) by checking the AFU (antenna feeder unit) circuit lines and connections for continuity and RF (radio frequency) performance with a "Standing Wave Coefficient" (KSV) test using an FSH3 spectrum analyzer from the GTS (Global Timing System). The FSH3 measurements were then transferred to the TP2 laptop and prepared for downlink to the ground.

After the testing, Malenchenko deinstalled and removed the BUAP from the onboard cabling system (BKS) and stowed it in the FGB at its original location. *[The PCE/MBRL components for ATV prox ops are the space-to-space radio "monoblock" (PCE Z0000), the antenna switching control box (BUAP), and the ATV control panel (PU) which Valery Tokarev dismantled last year (March 2006) after (reportedly successful) three-day end-to-end testing.]*

Later, the FE-1 transferred application software log files from the Russian RS3 laptop to a CD-ROM disk for subsequent downlink.

CDR Whitson and FE-2 Tani had ~2 hrs reserved for stowing discarded U.S. cargo on Progress 26P, currently docked at the DC-1 nadir port, for disposal later this month (12/22).

After reviewing today's EPO (Educational Payload Operation) session and setting up the PD-100 camcorder, Dan Tani and Peggy Whitson performed and narrated a demo of Newton's 1st Law of Motion. Afterwards, the EPO hardware was put back in stowage. *[The activities were downlinked in real-time video/audio via Ku- & S-band and taped on the ground. Today's activities were a repetition of a demo earlier this month which was out of camera focus.]*

The CDR completed the PiP (Inventory Management System/Plug-in Plan) audit in the US Segment (USOS) started yesterday, listing Node-1 and Airlock UOPs (Utility Outlet Panels) and providing connectivity information including power supplies, cabling, and equipment updates to the IMS (Inventory Management System). *[The audit allows IMS to accurately reflect the parent-child relationship for how equipment is plugged in on ISS.]*

Tani meanwhile arranged for a better protected stowage place for a spare Ku-band Forward Link Receiver unit behind a closeout panel of the Node-2 DDCU (DC-to-

DC Converter Unit) rack.

Dan also stowed a number of MLI (Multi-Layer Insulation) cover pieces in “Harmony”, which were retrieved and brought in from the recent external Node-2 outfitting work, such as the PDGF (Power & Data Grapple Fixture) mounting ring MLI.

Peggy serviced the EMCS (European Modular Cultivation System) in ER3 (EXPRESS Rack 3) by removing the water reservoirs from both rotors and replacing them with new reservoirs (#FM005 on Rotor A, #FM006 on Rotor B). The old H<sub>2</sub>O tanks were stowed. *[The 298-kg EMCS, delivered on ULF1.1, is a multi-purpose combination centrifuge/growth chamber with eight small research containers that allows plant growth experiments to be carried out in controlled partial and microgravity conditions and under controlled pressure, light, temperature and humidity. The goal of these experiments is to enable growing plants in space that could serve as a basic nutrition source for astronauts on future long-duration missions to the Moon or Mars.]*

Later, the CDR performed troubleshooting on the Node-2 ATU-15 (Audio Terminal Unit 15) on the port side, after verifying that the Node-2 starboard ATU-7 is functioning separately from ATU-15. *[Troubleshooting of the failed ATU-15 was to include checking for debris in the ATU's headset/PMIC (Portable Microphone) connector, for a stuck control button, etc.]*

The FE-2 undertook the monthly FDS PEP (Fire Detection & Suppression/Portable Emergency Provisions) safety inspection/audit. *[The IMS-supported inspection involves verification that PFEs (portable fire extinguishers), PBAs (portable breathing apparatus), QDMAs (quick-don mask assemblies) and EHTKs (extension hose/tee kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware (QDMA harness inspection was not required this time). In the USOS, there are a total of 5 PFEs and 7 PBAs, plus 7 QDMAs and 4 EHTKs.]*

Whitson ran the periodic check of active U.S. payloads, i.e., cleaning the ANITA (Analyzing Interferometer for Ambient Air) inlet plus inspecting and filter cleaning of the CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The CGBA incubator is controlled from the ground, with automatic video downlinked to Earth. ANITA continues to collect data every six seconds and downlinks the data daily to the ground team. ANITA monitors low levels of potential gaseous contaminants in the ISS cabin atmosphere with a capability of simultaneously monitoring 32 gaseous contaminants. The experiment is testing the accuracy and reliability of this technology as a potential next-generation atmosphere trace-gas monitoring system for ISS and future spacecraft. This is a*

*cooperative investigation with the European Space Agency.]*

Yuri performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Later, the FE-1 handled the daily IMS maintenance, updating/editing its standard “delta file” including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers conducted their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Tani copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

CEO (Crew Earth Observation) photo targets uplinked for today were **Bosumtwi Impact Crater, Ghana** *(the crew had a nadir pass over this 10.5 km diameter impact structure. The crater is filled with a lake; cloud cover was expected to be minimal so the crew was asked to look for this distinctive feature. Ground recommendation was to start taking overlapping nadir frames along-track as ISS approached the African coastline as a good strategy to capture the crater), Lake Poopo, Bolivia* *(weather was predicted to be clear over Lake Poopo. Imagery of the shoreline of the Lake is requested for monitoring of water levels. Water levels respond quickly to changes in regional precipitation, making the Lake a useful indicator of regional climate change. Looking the left of track for the Lake, and for large white salars [salt pans] to the south), and Caracas, Venezuela* *(orbit track brought the ISS over the western urban-rural fringe of the Venezuelan capital of Caracas. The city is located in a valley of the northern Coastal Range of Venezuela. Overlapping, nadir mapping frames of the western metropolitan area, taken along-track, are requested).*

CEO photography can be viewed and studied at the websites:

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<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

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Solar Beta Angle -- -9.2 deg (magnitude increasing)

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12/23/07 -- Progress M-62/27P launch

12/26/07 -- Progress M-62/27P docking (DC1)

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*Launch period opens.*

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02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour undocking

02/29/08 -- STS-123/Endeavour landing

03/01/08 -- Progress M-62/27P undocking (DC1) & reentry

03/06/08 -- NET: ATV-1 docking (SM aft port)

04/07/08 -- Progress M-63/28P undocking (DC1) & reentry

04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)

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04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)

04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- NET: ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/18/08 -- STS-126/Discovery/ULF2 launch – MPLM Leonardo, LMC  
09/29/08 -- STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **50<sup>th</sup> Birthday of NASA**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
11/06/08 -- STS-119/Discovery/15A launch – S6 truss segment  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch**  
04/??/10 -- STS-132/Discovery/20A – Node-3 + Cupola.

Note: The daily ISS On-Orbit Status reports can also be found at  
[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/11/07  
**Date:** Tuesday, December 11, 2007 2:39:18 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/11/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-2 Dan Tani again accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software after wakeup and before breakfast, for data logging, completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

FE-1 Yuri Malenchenko underwent the periodic (generally monthly) health test with the cardiological experiment PZEh MO-1 ("Study of the Bioelectric Activity of the Heart at Rest") on the TVIS (Treadmill with Vibration Isolation System). *[During the 45-min. test, the FE-1 tagged up with ground specialists on a Russian ground site (RGS) pass via VHF (~4:32am EST) and downlinked data from the Gamma-1M ECG (electrocardiograph) for about 5-6 minutes.]*

Later, Malenchenko also conducted a run with the Russian MBI-21 PNEVMOKARD experiment, his second on-orbit session (which forbids moving or talking during data recording). The experiment is controlled from the RSE-Med A31p laptop, equipped with new software, and uses the TENZOPLUS sphygmomanometer to measure arterial blood pressure. *[PNEVMOKARD (Pneumocard) is an attempt to obtain new scientific information to refine the understanding about the mechanisms used by the cardiorespiratory system and the whole body organism to spaceflight conditions. By recording (on PCMCIA cards) the crewmember's electrocardiogram, impedance cardiogram, low-frequency phonocardiogram (seismocardiogram), pneumotachogram (using nose temperature sensors), and finger photoplethysmogram, the experiment supports integrated studies of (1) the*

*cardiovascular system and its adaptation mechanisms in various phases of a long-duration mission, (2) the synchronization of heart activity and breathing factors, as well as the cardiorespiratory system control processes based on the variability rate of physiological parameters, and (3) the interconnection between the cardiorespiratory system during a long-duration mission and the tolerance of orthostatic & physical activities at the beginning of readaptation for predicting possible reactions of the crewmembers organism during their return to ground.]*

In the Lab, after inspecting, activating and configuring the MSG (Microgravity Science Glovebox) facility, FE-2 Tani initiated another vacuum draw on the sample chamber (by opening the vent and vacuum valves) for subsequent CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment ops for its third run. *[Ground analysis of the downlinked data for SPU-2 (Sample Processing Unit #2), which ran from 12/3-12/5, indicated excellent science results (samples to be returned to Earth), boding well for SPU-3 which the ground started today.]*

Using a printout of the IMS PiP (Inventory Management System/Plug-in Plan) tool, CDR Peggy Whitson spent about 3 hrs on the periodic PiP audit, focusing on Lab, Node-1 and Airlock. *[Node-2 not required. The PiP is a tabular compilation listing locations where on-board electrical equipment is plugged in.]*

Yuri Malenchenko had several hours reserved for maintenance work on the ATV PCE (Automated Transfer Vehicle/Proximity Communications Equipment; Russian: MBRL) in the Service Module (SM), installing and connecting its antenna switching control box (BUAP) to the onboard cabling system (BKS) for ground-commanded testing. *[The MBRL components are the space-to-space radio "monoblock" (PCE Z0000), the antenna switching control box (BUAP), and the ATV control panel (PU) which Valery Tokarev dismantled last year (March 2006) after (reportedly successful) three-day end-to-end testing.]*

The FE-2 conducted more inflight coolant sampling on the Node-2 ITCS (Internal Thermal Control System)'s MTL (Moderate Temperature Loop) by adjusting its fluid sampling adapter metering valve and then taking another periodic fluid sample for OPA (Ortho-Phthalaldehyde) testing (with test strips). The sampling process for OPA was then repeated on the LTL (Low Temperature Loop) side of the Node-2 ITCS and subsequently also on the MTL loop of the Lab ITCS. *[OPA, an antimicrobial agent, was introduced into the Lab ITCS coolant by the AmiA (Antimicrobial Applicator), before the AmiA was removed again on 11/2 by Clay Anderson for Earth return.]*

Peggy Whitson checked out IMV (Intermodular Ventilation) performance between the US (USOS) and Russian segment (RS) by first using the Velocicalc meter to take airflow measurements at fan sites, then cleaning the inlet flow straighteners at

the Node-1 & Lab aft port ventilators and finally again measuring their airflow rates. *[After FOD (Foreign Object Debris) removal by Peggy, flow rate increased from 75 cfm (cubic feet /minute) to 106 cfm (i.e., nominal). There is no direct measurement of airflow except as reflected by differences in atmosphere partial pressures measured between the RS and USOS. ppCO<sub>2</sub> (CO<sub>2</sub> partial pressure) is a good yardstick since an increasing ppCO<sub>2</sub> in the Lab not reflected in the SM indicates that Vozdukh is not receiving the air from the Lab at an efficient rate. Periodic air flow degradation checks support establishing a most effective fan cleaning schedule.]*

Dan Tani and Peggy (from “job jar” task list) had 75 min set aside for replacing a failed PDA (Personal Digital Assistant), used for updating the IMS, with a new PDA. *[PDA #1010 (with failed display) was replaced by PDA #1004; the latter was then equipped with the battery from #1010 and reloaded with uplinked BCR (Barcode Reader) software to recover BCR functionality for the IMS.]*

Dan also set up the EPO (Educational Payload Operations) PD-100 camcorder for downlinking his subsequent EPO Demo of “Living on the Station”, taking the viewersx through the living area of the ISS and explaining its utilization by the crew. *[The activities were downlinked in real-time video/audio via Ku- & S-band and taped on the ground. Peggy’s EPO demo of “Sanitation on the Station” of 12/7, discussing “house-cleaning” methods and the importance of good sanitation onboard ISS, received great kudos by ground specialists for its excellence.]*

Yuri performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Later, the FE-1 handled the daily IMS (Inventory Management System) maintenance, updating/editing its standard “delta file” including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

On the RED (Resistive Exercise Device), the FE-2 performed the periodic (every two weeks) inspection of the canister cords and accessories. The maintenance today also included tightening the RED hardmount plate bolts on the Node-1 “ceiling”, done once every 6 months.

The crewmembers conducted their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS

cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1/MO-1), RED (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Tani copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~11:50am EST, Dan had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

*Stage EVA Planning:* Because of the Mission 1E stand-down till early January (based on solar Beta angle restrictions, not on anticipated time for resolving ECO/ Engine Cut-off sensor issues), teams are currently assessing a possible Stage-10A EVA (on or around 12/18) for in-situ inspection & photography of the damaged starboard SARJ (Solar Alpha Rotary Joint) and also the 1A BGA (Beta Gimbal Assembly) on the S4 truss, particularly its BMRRM (Bearing Motor Roll Ring Module). *[Background: On 12/8, a currently unknown anomaly caused a trip of three separate power feeds going through the BMRRM to the BGA ECU (Electronics Control Unit), resulting in loss of redundancy (i.e., the ECU remains powered by the redundant feed; the primary feed is off). To protect for 1E docking, the 1A BGA was then parked at 79 degs and latched.]*

CEO (Crew Earth Observation) photo targets uplinked for today were **Ganges River Delta** (*ISS flew over the easternmost portion of the Ganges Delta, near the border region of India, Bangladesh, and Myanmar. The crew was to shoot to the left of track for the Delta. Overlapping mapping frames along-track were requested to document stream channel and coastal morphology*), **South Tibesti Megafans** (*ISS orbit track was to the SE of a series of large fanlike spreads of sediment, hundreds of km long and wide, that extend southward from the Tibesti Mts into central Chad. A discontinuous overlapping pattern of former stream channels, large and small, suggests that the entire surface of the megafans was formed by the action of rivers shifting across the surface when the regional climate was wetter. This megafan structure also serves as a potential analog for channel structures on Mars. Looking to the left of track for the channel pattern; oblique imagery will aid geolocation of higher resolution nadir imagery*), **Oasis Impact Crater, Libya** (*Libya contains several recognized impact structures of various ages and sizes. ISS passed over two of these craters; the first encounter was with the Oasis Crater. This crater appears as a circular structure of dark rocks contrasting sharply with the surround desert. Overlapping mapping frames, along-track and begun as the station approached the target coordinates, were suggested to ensure capturing imagery of the crater*), and **B.P. Structure, Libya** (*looking slightly to the left of track*

*after passing over the previous Oasis Crater target. The B.P. Structure is roughly one-quarter the size of the Oasis Crater, and has less contrast with the surrounding desert. As with the previous target, overlapping mapping frames provide the best chance of capturing imagery of the impact structure).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this noon, 12:12pm EST [= epoch]):

Mean altitude -- 338.0 km

Apogee height -- 338.5 km

Perigee height -- 337.5 km

Period -- 91.29 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.000072

Solar Beta Angle -- -4.6 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 130 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51878

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

*NET = Not Earlier Than):*

12/22/07 -- Yuri Malenchenko's Birthday

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/26/07 -- Progress M-62/27P docking (DC1)

01/02/08 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET).

*Launch period opens.*

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour undocking

02/29/08 -- STS-123/Endeavour landing

03/01/08 -- Progress M-62/27P undocking (DC1) & reentry  
03/06/08 -- NET: ATV-1 docking (SM aft port)  
04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
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[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/10/07  
**Date:** Monday, December 10, 2007 12:37:57 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/10/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 8 of Increment 16.*

Aboard the space station, FE-2 Dan Tani again accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software after wakeup and before breakfast, for data logging, completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

CDR Whitson (as Operator) and FE-2 Tani (as Subject) conducted the first scanning session for the Braslet experiment (SDTO/Station Development Test Objective), leading off by a material review by Peggy and followed in the afternoon by the actual ultrasound scanning activity on the FE-2 (who had to abstain from caffeine 12 hrs prior to the scan session, heavy meals 4 hrs before and any food at all 2 hrs prior to the scan, plus no exercise 2 hours before and no liquids 30 mins before). *[The SDTO-17011 "Validation of On-Orbit Methodology for the Assessment of Cardiac Function and Changes in the Circulating Volume Using Ultrasound and Braslet-M Occlusion Cuffs (Braslet)" is a collaborative effort between NASA and the Russian FSA (Federal Space Agency), with the goal to establish a valid ultrasound methodology for assessing a number of aspects of central and peripheral hemodynamics and cardiovascular function, specifically in rapid changes in intravascular circulating volume. Braslet uses Braslet-M occlusion cuffs, i.e., the Russian-made operational countermeasure already pre-calibrated and available onboard for each ISS crewmember. Braslet employs multiple modes of ultrasound imaging and measurements, in combination with short-term application of Braslet-M occlusive cuffs and cardiopulmonary maneuvers (Valsalva, Mueller) to demonstrate and to evaluate the degree of changes in the circulating*

*volume on orbit. This will be accomplished by performing echocardiographic examinations in multiple modes (including Tissue Doppler mode), ultrasound measurements of lower extremity venous and arterial vascular responses to Braslet-M device under nominal conditions and also during cardiopulmonary Mueller and Valsalva maneuvers. Identical measurements will be repeated without Braslet-M, with Braslet-M applied, and immediately after releasing the occlusion device.]*

FE-1 Malenchenko meanwhile worked on the Russian BRPK Condensate Separation & Pumping Unit, disassembling its DU-6 electromagnetic valve into its two halves, inspecting the membrane inner cavities and cleaning the valve of any deposits that could obstruct flow. The valve was then reassembled, reinstalled and tested.

Later, Malenchenko continued the current round of preventive maintenance on the Russian segment (RS) ventilation system, cleaning the TsV1, SV2 & VT7 ventilation system fans in the FGB and changing out the filters in the PF1-4 dust collector cartridges in the SM (Service Module).

Peggy Whitson and Dan Tani completed a major IFM (Inflight Maintenance) task on the Lab ITCS (Internal Thermal Control System) by refilling both its MTL (Moderate Temperature Loop) and LTL (Low Temperature Loop) lines with coolant fluid, using the FSS (Fluid System Servicer) equipment. *[Prior to the refilling activities, Dan Tani had to remove stowage goods temporarily to provide access to the Lab's ITCS rack and clear the way for FSS ops. Crew and Ground activities had to be carefully timed for the loop fills due to the large interaction between the Crew and Ground required in performing this activity. Prior to any Crew action, the Ground configured the system from single loop LT mode to dual loop mode, depressurizing the loops, and configuring software in preparation for ITCS loop fills. Following the loop fills, the Ground returned the ITCS system to its nominal single LT mode, and the ITCS rack was subsequently restowed and put back in action.]*

Yuri conducted the regular weekly task of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- & FGB-to-Soyuz tunnels, and the DC1-to-Progress and FGB-to-Node-1 passageways.

Performing the periodic (generally monthly) service of the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), the FE-1 removed the PCMCIA memory card #934 from the AST spectrometer's slot and copied the accumulated data for subsequent downlinking via OCA. Card 934 was then bagged for return to Earth and PCMCIA card 940 inserted to continue AST ops.

Using the SKDS CMS (Pressure Control & Atmosphere Monitoring System/

Countermeasure System), Malenchenko took readings of potentially harmful contaminants in the SM. The hardware was then returned to initial stowage. *[The CMS uses preprogrammed microchips to measure Formaldehyde (H<sub>2</sub>CO, methanal), Carbon Monoxide (CO) and Ammonia (NH<sub>3</sub>), taking one measurement per microchip.]*

The FE-2 checked out the IMV (Intermodular Ventilation) valves on the port & starboard side of the Lab aft end.

Yuri performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Later, the FE-1 handled the daily IMS (Inventory Management System) maintenance, updating/editing its standard “delta file” including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers conducted their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, the CDR copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~9:10am EST, the crew participated in two PAO TV message/greeting downlinks, the first an improvised Christmas and New Year’s greeting from all three, taking turns to talk about the holidays ahead on board, the second addressed to the NASA-sponsored series of “Future Forums” throughout 2008 in observance with the agency’s 50<sup>th</sup> anniversary, showcasing technology and how NASA’s Exploration plans tie in to the future. *[The Forums are scheduled for Seattle (Jan. 25, 2008), Columbus, Ohio (Feb. 21), New York City (March), Miami (April), Sacramento (May 2), Boston (September) and Chicago (October 2-3).]*

At ~2:00pm, the crew is scheduled for their 5<sup>th</sup> weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio *[S/G-2 (Space-to-Ground 2) phone patch*

via SSC-10 (Station Support Computer 10)].

**BGA & BCDU Events:** On 12/6, BGA (Beta Gimbal Assembly) 1A experienced an LOC (Loss of Communications) due to multiple occurrences of an overcurrent trip. Also BCDU 3A1 CP RBI (Battery Charge/Discharge Unit/CP Remote Bus Isolator), a fuse-type switch, tripped open on the first event. The RBI was recovered, and there is no additional impact. On BGA 1A, the secondary power feed, RPC2 (Remote Power Controller 2 of RPCM 3A\_A (RPC Module), is closed and the primary feed (RPCM 1A\_A RPC 1) is open. In this configuration there is a loss of redundancy. After the initial cleanup activities, work is now underway to assess and remedy the situation (which benefits from the 1E mission scrub).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:30am EST [= epoch]):

Mean altitude -- 338.2 km

Apogee height -- 338.6 km

Perigee height -- 337.7 km

Period -- 91.30 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0000611

Solar Beta Angle -- -0.2 deg (magnitude bottoming out)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 124 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51868

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

*NET = Not Earlier Than):*

12/22/07 -- Yuri Malenchenko's Birthday

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/26/07 -- Progress M-62/27P docking (DC1)

01/02/08 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET).

*Launch period opens*

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]

02/07/08 -- Progress M-63/28P launch  
 02/09/08 -- Progress M-63/28P docking  
 02/14/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
 02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS  
 02/16/08 -- STS-123/Endeavour/1J/A docking  
 02/27/08 -- STS-123/Endeavour undocking  
 02/29/08 -- STS-123/Endeavour landing  
 03/01/08 -- Progress M-62/27P undocking (DC1) & reentry  
 03/06/08 -- NET: ATV-1 docking (SM aft port)  
 04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
 04/08/08 -- Soyuz TMA-12/16S launch  
 04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
 04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
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 09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
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 04/??/09 -- **Six-person crew on ISS**  
 04/15/09 -- **Constellation's Ares I-X Launch.**

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/09/07  
**Date:** Sunday, December 09, 2007 4:52:08 PM  
**Attachments:**

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### **ISS On-Orbit Status 12/09/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for CDR Whitson, FE-1 Malenchenko and FE-2 Tani. Ahead: Week 8 of Increment 16.*

**The launch of STS-122/Atlantis/Mission ISS-1E has now been targeted for not earlier than 1/2/08, to allow for more concerted troubleshooting of the four LH<sub>2</sub> low level cutoff sensors (after the #3 sensor again failed during another tanking attempt this morning).**

Aboard the space station, FE-2 Dan Tani again accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software after wakeup and before breakfast, for data logging, completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

The FE-2 later conducted inflight maintenance on the Node-2 ITCS (Internal Thermal Control System)'s MTL (Moderate Temperature Loop) by adjusting its fluid sampling adapter metering valve and then taking another fluid sample for return to the ground and one for OPA (Ortho-Phthalaldehyde) testing.. Afterwards, Dan repeated the sampling process on the LTL (Low Temperature Loop) side of the Node-2 ITCS. *[OPA, an antimicrobial agent, was introduced into the Lab ITCS coolant by the AmiA (Antimicrobial Applicator).]*

FE-1 Malenchenko performed monthly maintenance on the Russian IK0501 GA (gas analyzer) of the SOGS Pressure Control & Atmospheric Monitoring System, deactivating the unit and replacing its CO<sub>2</sub> filter assembly (BF) with a new unit from

FGB stowage (replaced last: 10/29). *[After ensuring good seals on the instrument's base and no leaks around the installed filter, Yuri reactivated the GA and stowed the spent BF for disposal. IK0501 is an automated system for measuring CO<sub>2</sub>, O<sub>2</sub>, and H<sub>2</sub>O in the air as well as the flow rate of the gas being analyzed.]*

CDR Whitson completed the periodic offloading of the Lab CCAA (Common Cabin Air Assembly) dehumidifier's condensate tank, filling CWC (Contingency Water Container) #1062 with the collected water slated for processing, and putting aside two water samples in sample bags for analysis. *[Estimated offload time before termination (leaving ~6 kg in the tank): ~20 min.]*

The crewmembers conducted their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Job items on Peggy's and Dan's discretionary "job jar" task list today were –

- Removal of panel fasteners in Node-2 to provide temporary access to the AR SDS (Atmosphere Revitalization/Sample Delivery System). *[The SDS, along with the MCA (Major Constituents Analyzer), PCA (Pressure Control Assembly), TCCS (Trace Contaminant Control Subassembly) and CVV (Carbon Dioxide Vent Valve assembly), is a subsystem of the Atmosphere Control & Supply System of the Lab's ECLSS (Environment Control & Life Support System)];*
- Lubrication of TVIS treadmill SPDs (Subject Positioning Devices); and
- Monthly battery check and rebooting of the PCS (Portable Computer System) A31p laptops.

No CEO photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 3:59am EST [= epoch]):

Mean altitude -- 338.3 km

Apogee height -- 338.7 km

Perigee height -- 338.0 km

Period -- 91.30 min.

Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0000524  
Solar Beta Angle -- 4.0 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in the last 24 hours -- 124 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 51841

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

*NET = Not Earlier Than):*

12/22/07 -- Yuri Malenchenko's Birthday  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/02/08 -- NET: STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [*Check it out at <http://usspace50.com/>*]  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/01/08 -- Progress M-62/27P undocking (DC1) & reentry  
03/06/08 -- NET: ATV-1 docking (SM aft port)  
04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- NET: ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC

10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **50<sup>th</sup> Birthday of NASA**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

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[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/08/07  
**Date:** Saturday, December 08, 2007 12:40:12 PM  
**Attachments:**

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### **ISS On-Orbit Status 12/08/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- off-duty day for CDR Whitson, FE-1 Malenchenko and FE-2 Tani except for housekeeping and voluntary work.*

**The delayed launch of STS-122/Atlantis/Mission ISS-1E has tentatively been rescheduled for tomorrow, Sunday (12/9) at 3:21pm EST, assuming no major problems turn up in engineering reviews taking place today. Weather forecast for 12/9 predicts an 80 percent chance of good weather.**

Aboard the space station, FE-2 Dan Tani again accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software after wakeup and before breakfast, for data logging, completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

For today's Voluntary Weekend Science activities, CDR Peggy Whitson started out with software replacement for the HRF-2 RIC (Human Research Facility 2 Rack Interface Controller), first replacing the HRF-2 laptop's Ultrabay Adapter, then

uploading the RIC software (EXPRESS Load 5) and rebooting the computer. *[This activity was also performed on HRF-1 on 12/2.]*

Later, Dr. Whitson also set up the PD-100 camcorder for unattended video of herself performing BCAT-3 (Binary Colloidal Alloy Test-3) science activities involving mixing magnet unsticking from Samples 3, 5 and 9, followed by returning the sample module from CGBA-4 (Commercial Generic Bioprocessing Apparatus 4), deactivating the hardware and leaving CGBA powered off but recabled.

FE-2 Dan Tani retrieved and stowed the two FMKs (Formaldehyde Monitoring Kits) deployed by him on 12/6 in the Lab (below CEVIS cycle) and SM (most forward handrail).

FE-1 Yuri Malenchenko completed the daily routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables. *[Regular daily SOZh maintenance consists among else of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

The crewmembers conducted their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, the CDR copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~6:35am, the FE-1 had his weekly PFC (Private Family Conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

### **Weekly Science Update** (Expedition Sixteen -- Week 7)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Radiation measurements continue nominally in the PIRS module. The next memory card replacement activity is currently scheduled on 12/10.

*ANITA:* Completed.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2*: Completed.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS)*: “Dan, thanks for completing your in-flight portion of the CCISS experiment! Also, thanks for completing the Holter check out procedure off the task list. The PI looks forward to seeing you on landing day!”.

*CFE (Capillary Flow Experiment)*: Reserve.

*CSI-2/CGBA (CGBA Science Insert #2/Commercial Generic Bioprocessing Apparatus)*: In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2)*: Complete.

*CSLM-2 (Coarsening in Solid-Liquid Mixtures 2)*: CSLM-2 SPU #2 operated 12/3-5, currently reviewing down linked files.

*EarthKAM (Earth Knowledge Acquired by Middle School Students)*: Complete.

*EPO (Educational Payload Operations)*: “Thank you for your excellent EPO Sanitation demo this week. The PD was very happy with the downlinked video and audio.”

*ETD (Eye Tracking Device)*: In progress.

*Integrated Immune*: In progress.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*: Complete.

*MISSE (Materials ISS Experiment)*: Ongoing.

*MTR-2 (Russian radiation measurements)*: Passive dosimeters measurements in DC1 “Pirs”.

*MULTIGEN-1*: From Week 5: MULTIGEN-1 samples will be downloaded on STS-122 (1E).

*MSG-SAME (Microgravity Science Glovebox)*: Complete.

*NOA-2 (Nitric Oxide Analyzer)*: Planned.

*NUTRITION/REPOSITORY*: In progress..

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):*  
Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* "Peggy, thanks for completing the Sleep Actiwatch download/initialization activity off the task list. You have monthly downloads, doffing the Actiwatch, and two more weeks of required sleep logging. Additional sleep logging is above and beyond and greatly appreciated by the PI. Dan, thanks for participating in the sleep experiment as a reserve subject. Please continue to sleep log until 12/14 to fulfill the three week requirement."

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):*  
In progress. To be conducted tomorrow (12/2).

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 12/6 the ground has received a total of 5,003 CEO frames for review and cataloging for Increment 16. "Once again about 1,000 frames in the past week alone! We are focusing our efforts on 5 sessions in which you acquired imagery with camera times corresponding to our target request times: S. Georgia/ S. Sandwich Islands, South Atlantic Ocean (2 sessions confirmed); Patagonian Glaciers (confirmed); Nairobi, Kenya; and Mt. Kilimanjaro, Kenya. We are also pleased to confirm your excellent imagery for Acraman Impact Crater, Australia with a few more clouds than we expected. A portion of your handsome image of the New Zealand capital of Wellington will be published on NASA/GSFC's Earth Observatory website this weekend. Your sharp, long lens view provides great detail for this rarely photographed city."

CEO photo targets uplinked for today were **Coastal dunes, Namibia** (Dynamic event. Small crescent-shaped dunes are driven north along the hyperarid coast of Namibia by very strong southerly winds. Small dunes move fast, many yards per year. Looking immediately left and right of track as ISS crossed the coastline [the driest part of the desert], shooting a few detailed images of the coastal strip where these small dunes occur. There is interest in comparing positions of known dunes through time, both for geological and budgetary reasons—dunes 2-4 feet high often cross roads and other infrastructures. Clearing these dunes [or slowing them down by spraying with oil] is a major public-works expense around the few coastal towns in Namibia.)

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 5:12am EST [= epoch]):

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Apogee height -- 338.8 km  
Perigee height -- 338.1 km  
Period -- 91.30 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0000509  
Solar Beta Angle -- 8.1 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in the last 24 hours -- 125 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 51826

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.  
*NET = Not Earlier Than*):

12/09/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite, ~3:21pm EST  
12/11/07 -- STS-122/Atlantis/1E docking

- o 12/12 -- EVA-1 (Walheim/Schlegel), 6.5h
- o 12/12 -- Columbus transfer & berthing @ Node-2
- o 12/13 -- Columbus ingress, ~5:08pm
- o 12/14 -- EVA-2 (Walheim/Schlegel), 6.5h
- o 12/16 -- EVA-3 (Walheim/Love), 6.5h

12/18/07 -- STS-122/Atlantis undocking  
12/20/07 -- STS-122/Atlantis landing  
12/22/07 -- Yuri Malenchenko's Birthday  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- NET: ATV-1 “Jules Verne” launch/Ariane V (Kourou, French Guyana)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM

## ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/01/08 -- Progress M-62/27P undocking (DC1) & reentry  
03/06/08 -- NET: ATV-1 docking (SM aft port)  
04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- NET: ATV-1 undocking (from SM aft port)  
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09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **50<sup>th</sup> Birthday of NASA**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch.**

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/07/07  
**Date:** Friday, December 07, 2007 4:15:35 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/07/07**

All ISS systems continue to function nominally, except those noted previously or below.

**After yesterday's launch scrub for STS-122/Atlantis/Mission ISS-1E due to failure indications of two (of four) engine cut-off sensors in the LH<sub>2</sub> tank, the Shuttle is now in a 48-hour turnaround to protect for launch no earlier than Saturday, at 3:43pm EST.**

Aboard the space station, FE-2 Dan Tani again accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software after wakeup and before breakfast, for data logging, completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

Afterwards, Tani started periodic maintenance work on the TVIS (Treadmill with Vibration Isolation & Stabilization) in the Service Module (SM) "pit", first powering the exercise machine off, then one hour later performing the 4-hr job of removing and replacing five Roller Bearing (#6, 7, 8, 9,10) on the forward left side of the treadmill. Afterwards the TVIS ready for use again.

CDR Peggy Whitson set up the EPO (Educational Payload Operations) camcorder for recording her subsequent EPO Demo of "Sanitation on the Station", discussing "house-cleaning" methods and the importance of good sanitation onboard ISS. *[The activities were also downlinked in real-time video/audio via Ku- & S-band.]*

FE-1 Yuri Malenchenko spent several hours with the periodic collection of cabin air samples, i.e. by using --

- The SKDS CMS (Pressure Control & Atmosphere Monitoring System/ Countermeasure System) to take readings of potentially harmful contaminants in the SM. *[The CMS, part of the GANK-4M analyses (see below), uses preprogrammed microchips to measure Formaldehyde (H<sub>2</sub>CO, methanal), Carbon Monoxide (CO) and Ammonia (NH<sub>3</sub>), taking one measurement per microchip. CMS is part of the GANK-4M analysis conducted today;*
- The GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]; and*
- The AK-1M adsorber and Draeger tubes to conduct the periodic sampling of cabin air for subsequent analysis on the ground. *[Yuri started out by taking air samples in the SM and FGB and to check for leaked-out Freon in the SM, then switched to the IPD-CO Draeger tubes sampler to check for CO (carbon monoxide) in the SM.]*

Dan Tani collected air samples also, with a U.S. GSC (Grab Sample Container) at the center of the Lab and SM.

Malenchenko had about 90 minutes set aside for major equipment servicing in the ASU toilet facility, changing out replaceable ASU parts with new components, viz., two receptacles (PR & MP), four hoses, a T-connector, an elbow fitting, an indicator, a filter insert (F-V), the pretreat container (E-K) with its hose. All old parts were discarded as trash. *[E-K contains five liters of pre-treat solution, i.e., a mix of H<sub>2</sub>SO<sub>4</sub> (sulfuric acid), CrO<sub>3</sub> (chromium oxide, for oxidation and purple color), and H<sub>2</sub>O (water). The pre-treat liquid is mixed with water in a dispenser (DKiV) and used for toilet flushing.]*

Peggy Whitson used the on-board OpsLAN printer to print out Node-2 Leak Pinpoint Procedures. The material was then placed in the ISS Leak Kit for reference.

Having finished the latest session of the German/Russian TEKh-20 Plazmenniy-Kristall/PK-3+ (Plasma Crystal-3+) experiment yesterday, the FE-1 disassembled the payload for subsequent removal and stowage.

Yuri performed the daily routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables. *[Regular daily SOZh maintenance consists among else of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV*

*waste water and EDV-U urine containers.]*

Later, Malenchenko completed the daily IMS (Inventory Management System) maintenance by updating/editing its standard “delta file” including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Yuri also performed the periodic (monthly) functional closure test of spare emergency vacuum valves (AVK) for the Vozdukh, in the spare parts kit. *[The AVKs are critical because they close the Vozdukh's vacuum access lines in the event of a malfunction in the regular vacuum valves (BVK) or a depressurization in the Vozdukh valve panel (BOA). Access to vacuum is required to vent CO<sub>2</sub> during the regeneration of the absorbent cartridges (PP). During nominal operation, the AVK valves remain open.]*

At 3:15pm EST, CDR Whitson is scheduled to conduct the periodic VHF1 emergency communications check over NASA's VHF (Very High Frequency) sites at Wallops Island (3:14-3:18pm), talking with Houston/Capcom, MSFC/PAYCOM (Payload Operation & Integration Center Communicator) and Moscow/GLAVNI (TsUP Capcom) in the normal fashion via VHF radio from a handheld microphone and any of the U.S. segment ATUs (audio terminal units). *[Purpose of the test is to verify signal reception and link integrity, and to ensure minimum required link margin during emergency (no TDRS) and special events (such as a Soyuz relocation).]*

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, the FE-2 copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~3:15am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

Job items on Peggy's and Dan's discretionary “job jar” task list today were crew departure preparations for Dan, Photo/TV bag audit/consolidation for both of them, and a session with the BCAT-3 (Binary Colloidal Alloy Test-3) Magnet Unstick,

using the CGBA-4 (Commercial Generic Bioprocessing Apparatus-4).

CEO photo targets uplinked for today were **Coastal dunes, Namibia** (*Dynamic event. Small crescent-shaped dunes are driven north along the hyperarid coast of Namibia by very strong southerly winds. Small dunes move fast, many yards per year. Looking immediately left and right of track as ISS crossed the coastline [the driest part of the desert], shooting a few detailed images of the coastal strip where these small dunes occur. There is interest in comparing positions of known dunes through time, both for geological and budgetary reasons—dunes 2-4 feet high often cross roads and other infrastructures. Clearing these dunes [or slowing them down by spraying with oil] is a major public-works expense around the few coastal towns in Namibia.*

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Solar Beta Angle -- 11.9 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 122 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51811

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

*NET = Not Earlier Than):*

12/08/07? -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite, ~3:43pm EST

12/10/07 -- STS-122/Atlantis/1E docking

- 12/11 -- EVA-1 (Walheim/Schlegel)
- 12/11 -- Columbus transfer & berthing @ Node-2
- 12/12 -- Columbus ingress
- 12/13 -- EVA-2 (Walheim/Schlegel)
- 12/15 -- EVA-3 (Walheim/Love)

12/17/07 -- STS-122/Atlantis undocking, ~8:22am  
12/19/07 -- STS-122/Atlantis landing ~12:29pm EST  
12/22/07 -- Yuri Malenchenko's Birthday  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/01/08 -- Progress M-62/27P undocking (DC1) & reentry  
03/06/08 -- NET: ATV-1 docking (SM aft port)  
04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- NET: ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **50<sup>th</sup> Birthday of NASA**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/06/07  
**Date:** Thursday, December 06, 2007 2:46:11 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/06/07**

All ISS systems continue to function nominally, except those noted previously or below.

**Today's launch of STS-122/Atlantis on Mission ISS-1E was postponed due to failure indications of two (of four) engine cut-off sensors in the LH<sub>2</sub> tank during early-morning tanking operations. The next liftoff opportunity is tomorrow, Friday, at 4:09pm EST.**

Aboard the space station, FE-2 Dan Tani again accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software after wakeup and before breakfast, for data logging, completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

FE-1 Malenchenko supported the Russian TEKh-20 Plazmennyi-Kristall/PK-3+ (Plasma Crystal-3+) experiment on its sixth day, first activating the turbopump in the Service Module (SM)'s Transfer Compartment (PkhO) for keeping the vacuum chamber (ZB) in the SM Work Compartment (RO) evacuated, then starting the experiment, terminating it later and performing close-down ops. Yuri copied the data to USB stick for subsequent downlinking via OCA, deactivated all the hardware, and disassembled and stowed it. *[Main objective of PK-3 is to study non-linear dust plasma wave propagation and dispersion ratio at a specified power of an alternating electric field, pressure, and a varied number of particles, controlled by the experimenter Today's experiment session was performed with 6.81- and 9.2-micron particles in Argon at different pressure and HF generator power output.]*

The FE-1 conducted a search in the RS (Russian Segment) for a "lost" back-up

feeder cable for the Kurs-P systems, to be installed later for using the KURS-P antenna for long-range rendezvous control.

Yuri also conducted an inspection of the BP1A onboard transmitter of the BITS2-12 onboard telemetry measurement system, located in the SM (Service Module) between panels 309 & 312, for possible malfunction. *[The troubleshooting focused on checking how well the device connector is mated to the cabling and whether a bonding strap is present and connected.]*

FE-2 Dan Tani performed the periodic deployment of two passive FMK (formaldehyde monitoring kit) sampling assemblies in the Lab (below CEVIS) and SM (most forward handrail) for two days, to catch any atmospheric formaldehyde on a collector substrate for subsequent analysis on the ground.

In the Joint Airlock (A/L), CDR Whitson terminated the charge cycle (after approximately 20 hrs) on the supplementary EMU battery started yesterday in the BSA (Battery Stowage Assembly).

Also in the A/L, Whitson and Tani transferred EMUs for 1E.

The FE-2 had time set aside for troubleshooting the television MPC (Multi-Protocol Converter) downlink, going through a number of progressive steps. *[Step 1: check cables; step 2: swap IEEE 1394 Firewire; step 3: swap the MPC.]*

Peggy Whitson supported ongoing troubleshooting testing on the MPEG-2 (Moving Pictures Expert Group 2) encoder, preparing for downlinking of log files of the system which is designed to transmit RS analog video signals (as opposed to digital signals) via Ku-band and MPEG-2 "streaming" packets over the U.S. OpsLAN. *[Prior end-to-end video test results were not as expected and the downlinked files need to be analyzed on the ground.]*

Dan Tani conducted inflight maintenance on the Node-2 ITCS (Internal Thermal Control System)'s MTL (Moderate Temperature Loop) by adjusting its fluid sampling adapter metering valve and then taking a fluid sample for return to the ground. Afterwards, Dan repeated the sampling process on the LTL (Low Temperature Loop) side of the Node-2 ITCS.

The CDR meanwhile performed the periodic offloading of the Lab CCAA (Common Cabin Air Assembly) dehumidifier's condensate tank, filling CWC (Contingency Water Container) #1062 with the collected water slated for processing, and putting aside two water samples in sample bags for analysis. *[Estimated offload time before termination (leaving ~6 kg in the tank): ~20 min. There is currently increased attention on water sampling after the discovery of some contaminated CWCs. The*

*identified contaminant, a common soil bacterium (unicellular organism) called Wautersia after Belgian microbiologist Georges Wauters, is no more critical than what is found often in faucet water on the ground or in farm soil. Wautersia lives off hydrogen & carbon dioxide, oxidizing H<sub>2</sub> and producing gaseous oxyhydrogen as energy for itself. Since it can turn sugar into a synthetic biodegradable fuel, it was seen for a short while as a promising long-term solution to the petroleum dependency, until it became clear that this “solution” would require gigantic amounts of expensive sugar.]*

Peggy Whitson also conducted the weekly 10-min. CWC audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated “cue cards” based on the crew’s water calldowns are sent up every other week.]*

The CDR took air samples for the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries are to be replaced if necessary. *[Purpose of the 15-min activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements. O<sub>2</sub> sensors checks used #1042, #1063, #1052, #1041. CO<sub>2</sub> sensors used are #1013, #1058, #1045. CO<sub>2</sub> level in Lab and SM was ~0.44%.]*

Yuri Malenchenko performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

The FE-1 took photographs behind panel 305 in the SM, to assess the operational temperature environment for the new GTS-2 (Global Timing System 2) experiment.

The FE-2 filled out the regular FFQ (Food Frequency Questionnaire), his 5<sup>th</sup>, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. At TsUP/Moscow, food specialists are currently preparing the Russian food “menu” for delivery by Progress M-63/28P next February. 28P will carry “bonus food” for Peggy and Yuri, plus about 15 kg of fresh food items (apples, grapefruit, oranges, lemons, garlic) in two containers.]*

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, the CDR copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~10:35am, the FE-2 had his weekly PFC (Private Family Conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

At ~11:45am, Yuri Malenchenko downlinked a PAO TV message of greetings, congratulating the CIS Anti-Terrorist Center personnel and Russia's Federal Security Forces on the 90<sup>th</sup> Anniversary of Russia's State Security Agency and for successfully completing their Baikonur 2007 International Antiterrorist Exercise.

CEO photo targets uplinked for today were **S. Georgia Island, S. Atlantic** (*International Polar Year (IPY) Site. Looking right of track for this remote island. Weather during this pass was expected to be marginal, but the crew was to try for detailed views of the glaciers on the north coast of South Georgia. South Georgia Island is mountainous with active glaciers. It has about 20 inhabitants, mainly scientists of the British Antarctic Survey. King Edward Point is the capital town, with fishing and whaling stations scattered along the more protected, leeward coast, to accommodate seasonal fishing boats. Tourism has recently become the largest income generator*), and **Mt. Kilimanjaro, Kenya** (*looking right of track for this peak. Snow-capped peaks can appear visually distinct from cumulus cloud. The ice fields on the summit at 19,000+ feet are melting fast.*)

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 4:44am EST [= epoch]):  
Mean altitude -- 338.7 km  
Apogee height -- 339.1 km

Perigee height -- 338.3 km  
Period -- 91.31 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0000621  
Solar Beta Angle -- 15.5 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in the last 24 hours -- 94 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 51794

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

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12/XX/07 -- STS-122/Atlantis/1E docking

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- o 12/XX -- Columbus transfer & berthing @ Node-2, ~5:30pm
- o 12/XX -- Columbus ingress, ~5:08pm
- o 12/XX -- EVA-2 (Walheim/Schlegel), ~11:28am, 6.5h
- o 12/XX -- EVA-3 (Walheim/Love), ~10:25am, 6.5h

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12/XX/07 -- STS-122/Atlantis landing ~12:29pm EST  
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02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS  
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04/15/09 -- **Constellation's Ares I-X Launch.**

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/05/07  
**Date:** Wednesday, December 05, 2007 4:44:01 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/05/07**

All ISS systems continue to function nominally, except those noted previously or below.

After wakeup and before breakfast, FE-2 Dan Tani accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging, completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

FE-1 Malenchenko supported the Russian TEKh-20 Plazmennyi-Kristall/PK-3+ (Plasma Crystal-3+) experiment on its sixth day, first activating the turbopump in the Service Module (SM)'s Transfer Compartment (PkhO) for keeping the vacuum chamber (ZB) in the SM Work Compartment (RO) evacuated, then starting the experiment, terminating it later and performing close-down ops. The turbopump will be deactivated tonight at ~4:25pm EST. *[Main objective of PK-3 is to study dust plasma wave propagation and dispersion ratio at a specified power of an alternating electric field, pressure, and a varied number of particles, controlled by the experimenter. Afterwards, Yuri copied the data to USB stick for subsequent downlinking via OCA, and turned off the hardware. This experiment was performed with 3.42-micron particles. The main goal is to study behavior of structures affected by permanent electrical field of varying amplitude and to compare their behavior to that when being exposed to low-frequency AC field. This experiment is conducted in a semi-automatic mode, to generate a homogeneous plasma dust cloud with a small void in the center by incrementally stepping down RF generator power output. Like yesterday, Yuri made four attempts during the experiment.]*

Malenchenko also serviced the Russian BMP (Harmful Impurities Removal

System), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The regen process will be terminated at ~3:55pm EST. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods. Filter bed 1 was regenerated yesterday.]*

CDR Peggy Whitson worked in Node-2, making preparations for the later deployment of an SSC (Station Support Computer) for COL (Columbus). *[For this Get-ahead task for Flight Day 6 of the 1E mission, Whitson registered the new laptop as SSC-13 and stowed it with its supplies and cables.]*

FE-2 Tani set up and tested a PCS (Portable Computer System) A31p laptop in Node-2, including its UOP (Utility Outlet Panel). *[The PCS was powered down once verification was complete.]*

Later, Dan downloaded the collected data from his final CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS) session on 12/4 and stowed the equipment. *[CCISS studies the effects of long-duration spaceflight on crewmembers' heart functions and their blood vessels that supply the brain (=“cerebrovascular”). Learning more about the changes in cardiovascular & cerebrovascular systems in zero-G could lead to specific countermeasures that might better protect future space travelers.]*

FE-2 Tani had about an hour set aside for more hardware packing for return on STS-122/Atlantis.

The CDR meanwhile serviced the CSLM-2 (Coarsening in Solid-Liquid Mixtures-2) payload, initiating data transfer from its SPU2 (Sample Processing Unit 2) hard drive to the MSG MLC (Microgravity Science Glovebox Laptop Computer).

*[Afterwards, Peggy verified the data transfer, powered down CSLM-2, removed and stowed SPU2 and inserted SPU3 instead. Later, she also deactivated the MSG via its A31p laptop.]*

In Node-1 “Unity” Whitson installed IMV (Intermodular Ventilation) equipment, replacing the starboard IMV Flange Saver with a new unit. *[The new Flange Saver will slow the equalization rate between the Airlock and the ISS in the event of an emergency triggered equalization during EVA campout, to prevent possible ear damage due to the rapid pressure increase in the airlock.]*

The crew joined in a 90-min. review of the latest timeline for the 1E missions, then, at ~10:25am EST, conducted a teleconference with ground specialists to discuss timeline particulars.

Peggy initiated charging an additional EMU battery in the A/L BSA (Airlock Battery Stowage Assembly) to support 1E. *[The logistics team decided that this battery is needed in order to stretch the remaining EMU batteries out until new ones can be manufactured.]*

Peggy and Dan conducted another 1E EVA procedures review and later tagged up with spacewalk specialists at MCC-Houston via S- & Ku-band.

The CDR also ran the periodic check of active U.S. payloads, i.e., cleaning the ANITA (Analyzing Interferometer for Ambient Air) inlet plus inspecting and filter cleaning of the CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to Earth.]*

Yuri Malenchenko completed the daily routine maintenance of the SM's SOZh environment control & life support system, with the regular replacements in its toilet system (ASU), plus the periodic checkout/verification of IP-1 airflow sensors in the various Russian Segment hatchways, including the SM-to-DC1 (22P) tunnel, and the FGB-to-Node and FGB-to-Soyuz passageways.

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, the FE-2 copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*Progress Prop Line Purge:* At ~11:25am EST, station attitude control was handed over from USOS (U.S. segment) momentum management to the RS MCS (Russian Segment Motion Control System) thrusters for the subsequent propellant line purge conducted by TsUP-Moscow on Progress 26P, docked at the DC1 Docking Compartment. For the purge operation, Dan Tani closed the protective Lab science window shutter. *[The fuel lines were purged at 11:38am for the regular ~ 9 minutes, the oxidizer lines at 1:29pm, also for 9 min. Attitude authority returned to USOS at 1:40pm. The purge will prevent any further transfer of propellant with 26P which was left with sufficient propellant to support the 1E mission where it will be used for roll control.]*

*ATU-6 Update:* Troubleshooting for the Airlock ATU-6 (Audio Terminal Unit #6) continued today. Audio engineers are reviewing the data dumps from the test.

*Latest STS-122 Launch Advisory:* The launch countdown is proceeding smoothly and there are no significant issues being worked. The launch window opens on Thursday, 12/6, at 4:26pm EST and closes at 4:36pm. The in-plane (optimal) launch time is 4:31pm and provides for a Flight Day 3 rendezvous and docking with the ISS. On 12/6, the weather forecast calls for a 90 percent chance of acceptable conditions at launch time.

CEO photo targets uplinked for today were **Nile floodplains, S Sudan** (Dynamic Event. ISS pass crossed the Nile where it forms a vast swampland with a complex pattern of channels on either side of the Nile. River channels here shift continuously. The present window between the rainy season [clouds] and the beginning of the fire season [smoke and fire scars obscuring patterns] is the best time to document changes in river course. This is part of ongoing research with interesting analogs for Mars. Images taken at nadir and a touch left—following the Nile in a mapping swath for ~2 mins—were requested), and **Galapagos Islands** (Dynamic Event. The present extra-dry La Nina phase should have caused a die-down of the little vegetation that exists. Documenting these extreme conditions was requested during this nadir pass.)

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<http://earthobservatory.nasa.gov/>

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**ISS Orbit** (as of this morning, 7:16am EST [= epoch]):

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Apogee height -- 339.2 km

Perigee height -- 338.4 km

Period -- 91.31 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0000571

Solar Beta Angle -- 18.8 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 93 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51780

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- o 12/10 -- Columbus ingress, ~5:08pm
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04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)

04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)

04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.

04/26/08 -- STS-124/Discovery/1J docking

05/04/08 -- STS-124/Discovery/1J undocking

05/14/08 -- Progress M-64/29P launch

05/16/08 -- Progress M-64/29P docking (DC1)

07/29/08 -- NET: ATV-1 undocking (from SM aft port)

08/11/08 -- Progress M-64/29P undocking (from DC1)

08/12/08 -- Progress M-65/30P launch

08/14/08 -- Progress M-65/30P docking (SM aft port)

09/13/08 -- Progress M-66/31P launch

09/15/08 -- Progress M-66/31P docking (DC1)

09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC

10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.

10/01/08 -- **50<sup>th</sup> Birthday of NASA**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

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[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/04/07  
**Date:** Tuesday, December 04, 2007 5:17:56 PM  
**Attachments:**

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## ISS On-Orbit Status 12/04/07

All ISS systems continue to function nominally, except those noted previously or below.

After wakeup and before breakfast, FE-2 Dan Tani accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging, completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Dan wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

FE-1 Malenchenko supported the Russian TEKh-20 Plazmennyi-Kristall/PK-3+ (Plasma Crystal-3+) experiment on its fifth day, first activating the turbopump in the Service Module (SM)'s Transfer Compartment (PkhO) for keeping the vacuum chamber (ZB) in the SM Work Compartment (RO) evacuated, then starting the experiment, terminating it later and performing close-down ops. The turbopump will be deactivated tonight at ~4:25pm EST. *[Main objective of PK-3 is to study dust plasma wave propagation and dispersion ratio at a specified power of an alternating electric field, pressure, and a varied number of particles, controlled by the experimenter. Afterwards, Yuri copied the data to USB stick for subsequent downlinking via OCA, and turned off the hardware.]*

Before breakfast and exercise, Malenchenko completed his first session with the periodic Russian MedOps test "Hematokrit" (MO-10), measuring red cell count of the blood. *[The blood samples were drawn from a finger with a perforator lancet, then centrifuged in two microcapillary tubes in the M-1100 kit's minicentrifuge, and its hematocrit value was read off the tubes with a magnifying glass. It is a well-known phenomenon of space flight that red blood cell count (normal range: 30-45%) tends to go down over time. After the exam, the data were saved in the IFEP*

*software (In-Flight Examination Program) on the MEC (Medical Equipment Computer), and Oleg Kotov stowed the equipment.]*

Afterwards, the FE-1 serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #1 of the regenerable dual-channel filtration system. The regen process will be terminated before sleeptime, at ~2:05pm EST. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

CDR Whitson activated the A31p laptop in the FGB for Russian segment (RS) to US segment (USOS) video transmission, after which Malenchenko and Tani conducted the downlink end-to-end testing of streaming video (analog signals) from the Russian TVS television system's KL-211 MPEG-2 TV Encoder via the new JSL (Joint Station LAN) and then to the ground by U.S. OCA.

FE-2 Tani completed his second (and last) on-orbit session with the CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS) experiment, with Peggy Whitson acting as operator, by setting up and donning the Holter Monitor, donning the CBPD (Continuous Blood Pressure Device), performing the Baro Study, doffing the CBPD, and starting the 24-hr passive heart rate data collection. Data are recorded on a PCMCIA memory card, with the HRF (Human Research Facility) rack laptop for control. Data download and equipment stowage is scheduled tomorrow (~7:10am EST) after the 24-hr period. *[CCISS studies the effects of long-duration spaceflight on crewmembers' heart functions and their blood vessels that supply the brain (=“cerebrovascular”). Learning more about the changes in cardiovascular & cerebrovascular systems in zero-G could lead to specific countermeasures that might better protect future space travelers. For the Baro study of CCIS, heart rate and blood pressure are being recorded for resting and timed breathing for 5 min, with no caffeine or food (water is acceptable) allowed two hours before the start of the Baro Study and no exercise prior to the Baro Study.]*

The CDR worked in the Airlock (A/L) to replace one of the two smoke detectors (SDs), which had shown erratic behavior in its data readouts, with a spare. The removed unit was temporarily stowed for later troubleshooting by the crew. *[Problems with tool access prevented two of the four fasteners from being installed to the designated torque value. Whitson tightened the two fasteners by hand. The fasteners are captive and no further action is required at this time. The smoke detector is now functioning nominally. During EVA Campout operations, the A/L duct SD is not available. If the A/L cabin SD continued this behavior during campout operations, there would have been the risk of a false fire alarm.]*

Also in the A/L, Peggy & Dan conducted the first part of troubleshooting tasks on the ATU-6 (Audio Terminal Unit 6). *[This first step was to verify there were no sticky keys on the ATU by pressing the all keys on the ATU keypad while a BIT (built-in test) was running. The test was completed successfully and no anomalies were reported. Troubleshooting will continue tomorrow. The ATU was reported locked up (“frozen”) on 10/17 and could not be reconfigured or set to Transmit. After cycling the unit out & back into Public Calls mode, the ATU functioned only intermittently.]*

The FE-2 meanwhile retrieved a PBA (Portable Breathing Apparatus) from Node-1 and installed it with its bottle (#1027) and mask (#1032) in the Node-2 aft emergency locker.

Peggy and Yuri each performed the CHeCS CMO (Crew Health Care Systems/ Crew Medical Officer) on-board training drill, a 30-min. video & audio refresher course, taken individually, to hone the CMO’s acuity in emergency medical operations. *[The proficiency drill focuses on re-familiarization with skills and techniques required in procedures related to medical issues arising on board and concludes with a self-assessment questionnaire. The HMS (Health Maintenance Systems) hardware, which includes ACLS (Advanced Cardio Life Support) equipment, may be used in contingency situations where crew life is at risk. To maintain proficiency, crewmembers spend one hour per month reviewing HMS and ACLS equipment and procedures via the HMS CBT (computer-based training) and the ACLS CBT.]*

In the A/L, Dan Tani continued prior EVA systems preparations for the 1E spacewalks.

Malenchenko inspected the Russian de-ionized water container (KOV/EDV), used for supplying water to the Elektron electrolytic oxygen (O<sub>2</sub>) generator, for bubbles and for filling it up, as necessary, with U.S. condensate from a CWC (Contingency Water Container). *[Air bubbles larger than ~10 mm in the water must be prevented from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Yuri also performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Later, the FE-1 handled the daily IMS (Inventory Management System)

maintenance, updating/editing its standard "delta file" including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The CDR and FE-2 had 30 min. reserved for a joint review of MSS (Mobile Service System)/Robotics operations planned for the STS-122/1E docked period.

Yuri performed the periodic collection & deletion of readings on the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the RBO-3-2 Matryoshka-R anthropomorphic (human torso) "phantoms" located inside the station for sophisticated radiation studies, collecting radiation measurements every 15 minutes around the clock.

At the HRF1 (Human Research Facility 1) rack, Whitson deactivated the MedOps cardiac defibrillator and conducted its periodic checkout, which was to be recorded on video and later dumped to the ground (Last time done: 10/16). *[This routine maintenance task is scheduled as soon as possible from Expedition start and every 60 days thereafter. For the checkout, the defib is connected to the 120V outlet, equipped with its battery (today #1020) and then allowed to charge, for about five seconds, to a preset energy level (e.g., 100 joules). After the button-triggered discharge, a console indicator signals success or failure of the test. The pacing signal is downlinked via S-band for 1 min. The HRF was powered down afterwards.]*

Peggy had another ~130 min set aside to prepack cargo items for transfer to STS-122/Atlantis for return to Earth.

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, the CDR copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Later, the crew conducted a joint review of uplinked STS-122/1E spacewalk procedures and will link up with EVA personnel at MCC-Houston at ~4:00pm via Ku- & S-band to discuss details.

At ~11:25am EST, the crew participated in a live PAO TV interview with the Chicago Sun Times (Andrew Herrmann). In the second part of the comm window, the crew downlinked a deferred release message of greetings to the Jules Verne

Adventure Film Festival. *[The Festival, to be held for the 15<sup>th</sup> year, this time in Los Angeles instead of Paris, honors the “Father of Science Fiction” whose name is carried by the first European ATV (Automated Transfer Vehicle).]*

At ~11:45am, the crew downlinked best wishes and congratulations to Lt. Gen. Vladimir Aleksandrovich Shatalov on the occasion of his 80<sup>th</sup> birthday next Saturday (12/8). *[Shatalov, twice Hero of the Soviet Union, is a veteran Pilot-Cosmonaut who flew on Soyuz 4, Soyuz 8, and Soyuz 10, making the first Russian space docking. Later, he served as Commander of GCTC (Gagarin Cosmonaut Training Center) from 1971-1987.]*

**Node-2 CAA:** Twelve of the 20 required liters of condensate have been collected in the Node-2 CCAA (Common Cabin Air Assembly) air conditioner. Node-2 is currently running cold. Moscow has turned off the Russian SKV air conditioner to help in the condensate collection.

**Progress 26P Purge:** Tomorrow (12/5), TsUP/Moscow will perform a purge of the 26P fuel systems. Enough reserve fuel will be left in 26P for it to support roll control as planned for 1E.

**Latest STS-122 Launch Advisory:** The launch countdown is going well and there are no significant issues being worked. The launch window opens on Thursday, 12/6, at 4:26pm EST and closes at 4:36pm. The in-plane (optimal) launch time is 4:31pm and provides for a Flight Day 3 rendezvous and docking with the ISS. On 12/6, there is a 0% chance of weather prohibiting tanking and a 10% chance of weather prohibiting launch due to low cloud ceilings. If there is a 24-hour launch delay, the probability of KSC weather prohibiting launch increase to 40% due to low cloud ceilings and a chance of rain showers.

CEO photo targets uplinked for today were **Betsiboka River Delta, Madagascar** (*Dynamic Event. The estuary of this river has filled with sediment just since WWII, and continues to change rapidly. Deforestation inland in Madagascar appears to be the main cause. Looking left for this coastal target which has been obscured by cloud for weeks*), **Nairobi, Kenya** (*Nadir pass over Kenya’s capital city. The gray speckled cityscape contrasts with the more uniform national park immediately to the south. A prominent straight border separates the two. The city is one of several whose rapid growth CEO observers are monitoring*), and **Patagonian Glaciers** (*weather may have been clear enough to shoot the often obscured glaciers on the cloudy, Pacific side of the Andes. Looking left and right of track for the smaller glaciers*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 6:55am EST [= epoch]):

Mean altitude -- 338.9 km  
Apogee height -- 339.2 km  
Perigee height -- 338.5 km  
Period -- 91.31 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0000555  
Solar Beta Angle -- 21.8 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in the last 24 hours -- 98 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 51764

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

*NET = Not Earlier Than*):

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite, ~4:31pm EST

12/08/07 -- STS-122/Atlantis/1E docking, ~1:15pm

- o 12/09 -- EVA-1 (Walheim/Schlegel), ~11:28am, 6.5h
- o 12/09 -- Columbus transfer & berthing @ Node-2, ~5:30pm
- o 12/10 -- Columbus ingress, ~5:08pm
- o 12/11 -- EVA-2 (Walheim/Schlegel), ~11:28am, 6.5h
- o 12/13 -- EVA-3 (Walheim/Love), ~10:25am, 6.5h

12/15/07 -- STS-122/Atlantis undocking, ~8:22am

12/17/07 -- STS-122/Atlantis landing ~12:29pm EST

12/22/07 -- Yuri Malenchenko's Birthday

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/26/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/01/08 -- Progress M-62/27P undocking (DC1) & reentry  
03/06/08 -- NET: ATV-1 docking (SM aft port)  
04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- NET: ATV-1 undocking (from SM aft port)  
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09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
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10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch.**

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/03/07  
**Date:** Monday, December 03, 2007 1:32:59 PM  
**Attachments:**

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### **ISS On-Orbit Status 12/03/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 7 of Increment 16.*

FE-1 Malenchenko continued his support of his first experiment session with the Russian TEKh-20 Plasma Crystal-3+ (Plazmennyi-Kristall/PK-3+) payload by activating the turbopump in the Service Module (SM)'s Transfer Compartment (PkhO) for keeping the vacuum chamber (ZB) in the SM Work Compartment (RO) evacuated. The turbopump will be deactivated tonight at ~4:25pm EST. *[Main objective of PK-3 is to study dust plasma wave propagation and dispersion ratio at a specified power of HF discharge, pressure, and a varied number of particles.]*

CDR Whitson and FE-2 Tani assisted the ground in deactivating the CDRA (Carbon Dioxide Removal Assembly) at 2:25am-3:25am EST, used to support yesterday's SPHERES experiment. With cooling no longer required, the crew also disconnected the LTL (Low Temperature Loop) jumper of the ITCS (Internal Thermal Control System) from the CDRA rack.

At ~3:05am, in support of HDTV (High Definition TV) playback & downlink by ground commanding, FE-2 activated the Photo/TV MPC (Multi-Purpose Converter). *[MPC was turned off again by Tani at ~1:20pm.]*

Dan then also set up the Ku-band for downlinking analog video signals (streaming video) via U.S. OCA from the Russian TVS television system in a test of the relatively new KL-211 MPEG-2 TV Encoder in the new JSL (Joint Station LAN).

The CDR prepared the CSLM-2 (Coarsening in Solid-Liquid Mixtures-2) experiment for operation, turned on the SAMS ICU (Space Acceleration Measurement System/ Interim Control Unit) in LAP2 Rack, and started CSLM-2 by activating heating of the sample.

Peggy and Dan spent time in the Joint Airlock to continue EVA preparations, today

verifying and configuring tools for the SARJ (Solar Alpha Rotary Joint) inspection on 1E EVA-2, then performing the regular checkout and test of the SAFER (Simplified Aid for EVA Rescue) units to be used for the spacewalks by Walheim, Schlegel and Love (#1006 & #1007).

Later, the crew conducted a joint review of uplinked STS-122/1E spacewalk procedures and will link up with EVA personnel at MCC-Houston at ~4:00pm via Ku- & S-band to discuss details.

Peggy and Dan each had ~90 min set aside to prepack cargo items for transfer to STS-122/Atlantis for return to Earth. The FE-2 used an additional 15 min for prepacking the failed IVCPDS (Intravehicular Charged Particle Directional Spectrometer) hardware for return. *[The IVCPDS, found to be hard failed on 10/30, was a secondary radiation detection measurement tool; the primary radiation measurement tool is the TEPC (Tissue Equivalent Proportional Counter).]*

The CDR conducted the microbial (bacterial & fungal) “T+5 Day” analysis of air samples collected on 11/28 by Dan Tani with the MAS (Microbial Air Sampler) kit in Lab, Node and SM. *[The sampling analysis is performed once per month for the first three months, and once every three months thereafter. Bacterial and fungal air samples are taken at two locations in each module. The colony growth on the sampling slides is analyzed after five days of incubation in four Petri dishes. For onboard visual analysis of media slides from SSK (Surface Sampling Kit), MCDs (microbial capture devices) from WMK (Water Monitoring Kit), coliform detection bags from MWAK (Microbial Water Analysis Kit), and Petri dishes from MAS, the crew has a procedure for visual inspection of samples for bacterial and fungal colony growths after appropriate incubation periods.]*

Continuing the current round of monthly preventive maintenance of RS (Russian Segment) ventilation systems, FE-1 Malenchenko inspected and cleaned the “Group B” (B1 & B2) fan grills in the SM, followed later by reporting to TsUP-Moscow on equipment status and any presence of moisture in work areas.

Yuri also performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Dan handled the daily IMS (Inventory Management System) maintenance, updating/editing its standard “delta file” including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Malenchenko set up the "Urolux" equipment, hooked it up to the Power Supply Center (BP Tsentr) and ran the periodic functional health test and calibration on it, then deactivating the hardware.

Later, the FE-1 unstowed and installed the equipment for the periodic Russian PZE-MO-10 "Hematokrit" testing that is scheduled tomorrow for him. *[MO-10 measures the hematocrit (red blood cell mass) value of the blood (it is a well-known phenomenon of space flight that red blood cell mass {normal range: 30-45%} tends to go down over time).]*

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Dan Tani copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~1:05pm, Peggy and Yuri had a 15-min teleconference with ground specialists to discuss the images downlinked from their recent (11/29) Shuttle RPM (R-bar Pitch Maneuver) skill training. *[The skill training prepares the crew for the bottom side mapping of the Orbiter at the arrival of STS-122/1E. During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Orbiter, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

At ~9:35am, Whitson and Tani participated in two live PAO TV interviews with media in Chicago, one with WGN Radio (Spike O'Dell), the other with WJMK Radio (Steve Dahl).

At 2:30pm, Dan is scheduled for a CDC (Crew Discretionary Conference).

*Lab/Node-2 Vestibule Leak Check Update:* The second Fine Leak check on the Lab/Node-2 vestibule conducted by Peggy Whitson on 12/1 has passed. The indicated pressure drop of ~9 mmHg in 7 hours is equivalent to a loss of 0.13 pound-mass of air at 14.7 psia. This is far below the limit criterion used, resulting in the conclusion that there is no leak. The vestibule was completely repressurized by equalization with the ISS stack and is ready for 1E.

*SSRMS Pre-launch Checkout Update:* The regular pre-launch checkout of the Canadian SSRMS (Space Station Remote Manipulator System) went without issue. The robotarm is now properly positioned for 1E, having “walked off” the Lab PDGF (Power & Data Grapple Fixture) and changed its base to the Node-2 PDGF.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:08am EST [= epoch]):

Mean altitude -- 339.0 km

Apogee height -- 339.3 km

Perigee height -- 338.6 km

Period -- 91.31 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0000554

Solar Beta Angle -- 24.4 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 93 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51749

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.

*NET = Not Earlier Than*):

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite, ~4:31pm EST

12/08/07 -- STS-122/Atlantis/1E docking, ~1:15pm

o 12/09 -- EVA-1 (Walheim/Schlegel), ~11:28am, 6.5h

o 12/09 -- Columbus transfer & berthing @ Node-2, ~5:30pm

o 12/10 -- Columbus ingress, ~5:08pm

o 12/11 -- EVA-2 (Walheim/Schlegel), ~11:28am, 6.5h

o 12/13 -- EVA-3 (Walheim/Love), ~10:25am, 6.5h

12/15/07 -- STS-122/Atlantis undocking, ~8:22am

12/17/07 -- STS-122/Atlantis landing ~12:29pm EST

12/22/07 -- Yuri Malenchenko’s Birthday

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/01/08 -- Progress M-62/27P undocking (DC1) & reentry  
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04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
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04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- NET: ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
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09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **50<sup>th</sup> Birthday of NASA**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/02/07  
**Date:** Sunday, December 02, 2007 2:08:20 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/02/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for CDR Whitson, FE-1 Malenchenko and FE-2 Tani. Ahead: Week 7 of Increment 16.*

FE-1 Malenchenko supported his first experiment session with the Russian TEKh-20 Plasma Crystal-3+ (Plazmennyi-Kristall/PK-3+) payload by activating the turbopump in the Service Module (SM)'s Transfer Compartment (PkhO) for keeping the vacuum chamber (ZB) in the SM Work Compartment (RO) evacuated. The turbopump will be deactivated tonight at ~4:25pm EST. *[Main objective of PK-3 is to study dust plasma wave propagation and dispersion ratio at a specified power of HF discharge, pressure, and a varied number of particles.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, Yuri Malenchenko performed preventive maintenance cleaning on the V3, FS5 & FS6 fan screens in the DC1 (Docking Compartment) and on the VPkhO, VdPrK, VPrK & TsV2 fan grilles in the FGB (*Funktsionalnyi-Grusovoi Blok*).

Peggy Whitson & Dan Tani both spent several hours of their own time with their selected "Voluntary Weekend Science" activities:

- The CDR started out with software replacement for the HRF-1 RIC (Human Research Facility 1 Rack Interface Controller), first replacing the HRF-1 laptop's Ultrabay Adapter, then uploading the RIC software (EXPRESS Load

5) and rebooting the computer. Later, Peggy also serviced the CGBA/CSI-02 (Commercial Generic Bioprocessing Apparatus Science Insert 2), sowing its PDA (Plant Development Habitat) with new seeds and then restowing the hardware.

- The FE-2 performed another session with the SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites) experiment, flying two & three satellites, requiring 2 video camcorders & 2 VTRs. Afterwards, Dan conducted an EPO (Educational Payload Operation) demo, recording a narrated tour of the ISS living area on a camcorder. As all EPO videos, the DVD will be used by the Educational Community for school classes.

The FE-1 meanwhile performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers. Weekly SOZh reports (on Sundays) to TsUP/Moscow deal with number & dates of water and urine containers, counter readings of water consumption & urine collection, and total operating time of the POTOK air filtration system.]*

The FE-1 completed the daily routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables. *[Regular daily SOZh maintenance consists among else of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

In the Joint Airlock, the CDR terminated the recharging on the second set of EVA batteries.

Working off his "time permitting" discretionary task list, Yuri conducted his third run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 still camera and SONY PD-150 camcorder to obtain high-contrast fields in ocean water color, wakes of turbulent water, and cloud cover pattern anomaly along the flight path. *[Special target zone was the Bay of Bengal in the Indian Ocean.]*

At ~7:30am EST, Malenchenko participated in an event set up for him in Moscow to cast his ballot in the Elections to the 5<sup>th</sup> State Duma of the Russian Federation Federal Assembly, formally authorizing his proxy agent Dmitry Alexandrovich Zhukov to fill out the ballot for him, with the required confidentiality being observed. *[Yuri: "Participation in Russia's political life is a crucial right of every citizen of the country! By casting our vote we shape the direction our nation will take in the future. Our future depends on our vote!"]*

At ~9:05am, the crew held a teleconference with crewmembers of the upcoming STS-122/1E mission via S- & Ku-band.

At ~10:35am, the FE-1 followed up on his earlier balloting with a downlink to an event arranged by Russia's Central Election Committee (Moscow) which today elects deputies to the State Duma of the Russian Federation Federal Assembly. Present at the event were Election Committee Chairman Vladimir Evgenyevich Churov and Yuri Malenchenko's family, Ekaterina Victorovna Malenchenko and daughter Camilla. *[“We are happy to welcome here the ISS crew consisting of Commander Peggy Whitson, Flight Engineer Daniel Tani, and Flight Engineer Yuri Ivanovich Malenchenko, the 78<sup>th</sup> cosmonaut of Russia and the 308<sup>th</sup> cosmonaut of the world. Specialists believe that your international crew has the most difficult and challenging mission in the entire station history because the science program involves many experiments some of which have never been staged before on the ISS...”]*

At ~2:30pm, the CDR had her weekly PFC (Private Family Conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:46am EST [= epoch]):

Mean altitude -- 339.1 km

Apogee height -- 339.5 km

Perigee height -- 338.6 km

Period -- 91.32 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0000612

Solar Beta Angle -- 26.6 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 93 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51733

**Significant Events Ahead** (all dates Eastern Standard, some changes possible.)

*NET = Not Earlier Than):*

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite, ~4:31pm EST

12/08/07 -- STS-122/Atlantis/1E docking, ~1:15pm

- 12/09 -- EVA-1 (Walheim/Schlegel), ~11:28am, 6.5h
- 12/09 -- Columbus transfer & berthing @ Node-2, ~5:30pm
- 12/10 -- Columbus ingress, ~5:08pm
- 12/11 -- EVA-2 (Walheim/Schlegel), ~11:28am, 6.5h
- 12/13 -- EVA-3 (Walheim/Love), ~10:25am, 6.5h

12/15/07 -- STS-122/Atlantis undocking, ~8:22am

12/17/07 -- STS-122/Atlantis landing ~12:29pm EST

12/22/07 -- Yuri Malenchenko's Birthday

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

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01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [*Check it out at <http://usspace50.com/>*]

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- NET: ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour undocking

02/29/08 -- STS-123/Endeavour landing

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 12/01/07  
**Date:** Saturday, December 01, 2007 2:43:42 PM  
**Attachments:**

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## **ISS On-Orbit Status 12/01/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday.*

FE-1 Malenchenko continued preparations for operating the Russian/German TEKh-20 Plasma Crystal-3 Plus (PK-3+) experiment payload. *[After yesterday's hardware setup, leak checking of the electronics box and evacuation of the vacuum work chamber (ZB) with the turbopump, the CDR conducted more testing and calibration, uploaded new software from a USB stick to the payload laptop, checked out the software installation and verified the readiness of the experiment. After additional leak checking on the work chamber during the day, Yuri will deactivate the turbopump tonight at ~4:25pm EST. The experiment is performed on plasma, i. e., fine particles charged and excited by HF (high frequency) radio power inside the evacuated work chamber. Main objective is to obtain a homogeneous plasma dust cloud at various pressures and particle quantities with or without superimposition of an LF (low frequency) harmonic electrical field. The experiment is conducted in automated mode. PK-3+ has more advanced hardware and software than the previously used Russian PKE-Nefedov payload.]*

CDR Whitson continued final 10A EVA preparations in the Joint Airlock (A/L) by setting up and starting the periodic scrubbing process on the cooling water loops of EMU (Extravehicular Mobility Unit) #3006 & #3018, afterwards initiating their ionic and particulate filtration, one at a time, with the ion and 3-micron filter. *[Purpose of the scrubbing, including iodination of the LCVGs (Liquid Cooling & Ventilation Garments) for biocidal maintenance, is the elimination of any biomass (organic) and particulate matter that may have accumulated in the loops.]*

The CDR then terminated the recharging on the first set of EMU helmet light and PGT (Pistol Grip Tool) batteries, started yesterday, and initiated the process on the second set. *[The recharged helmet light batteries were then installed in the #3006 & #3018 EMUs, the PGT batteries in PGTs #1001, #1005, #1004 & #1008. Remaining charged batteries were stowed.]*

FE-2 Dan Tani (who will return to Earth with STS-122/Atlantis in two weeks) performed the standard inspection and degassing of A/L PWRs (Payload Water Reservoirs, #1012, #1013). *[The de-gassing manually removes any air bubbles from the PWR water to minimize the amount of air introduced into the EMU feedwater tanks.]*

While waiting for the EMU scrubbing to complete, Peggy Whitson terminated the Fine Leak check conducted overnight on the Lab/Node-2 vestibule, then repressurized the vestibule, restowed the measuring equipment and re-installed the IMV (Intermodular Ventilation) supply-&-return jumpers, two ducts and four O-rings.

The FE-2 meanwhile took two water samples from the EDV water container associated with the hygiene station in the FGB for return on 1E, one from flush water, the other for post-flight microbial analysis.

Peggy & Dan conducted the standard pre-launch SSRMS (Space Station Remote Manipulator System) checkout activities. The SSRMS was then maneuvered by the ground via S-band to the position required for 1E: first a base change (~7:50-8:50am EST) by "walking off" the Lab PDGF (Power & Data Grapple Fixture), i.e., grappling the Node-2 PDGF and releasing the Lab PDGF, then moving its joints by JOCAS (Joint Operator Commanded Auto Sequence) through two "waypoints" to the 1E start position.

Yuri Malenchenko performed the semi-annual inspection and photo-documentation of Service Module (SM) windows, tagging up with ground specialists. To check for new defects, photographs of the window panes will be recorded, along with text files, on the RSK1 laptop for subsequent downlink via U.S. OCA assets. *[Objective of the inspection, using digital still camera (Nikon D1X w/SB-28DX flash), voice recorder and a flaw log, is to assess the pane surfaces on SM windows 6, 7, 8, 12, 13 for any changes (new cavities, scratches, new or expanded old stains or discolorations affecting transparency properties) since the last inspection, performed by Oleg Kotov on 6/26/07. The new assessment will be compared to the earlier observations.]*

Later, Peggy connected the regular ITCS LTL (Internal Thermal Control System/ Low Temperature Loop) coolant jumper to the LAB1D6 rack, to support the ground-commanded activation of the U.S. CDRA (Carbon Dioxide Removal Assembly) at ~3:00pm in support of tomorrow's SPHERES experiment by Dan. *[The experiment's floating "satellite" spheres use CO<sub>2</sub> as propellant.]*

The FE-1 completed handled the daily routine maintenance of the SOZh system

(Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables. *[Regular daily SOZh maintenance consists among else of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

In the SM, Malenchenko worked on the ESA/Russian KUBIK-3 refrigerator, setting it up, copying data to laptop, switching the data cable, copying data again, for download via BSR-TM payload telemetry channel, then closed out operations and deactivated the refrigerator. Stowage was to be photographed as a task item from the voluntary "time permitting" job list.

As a second discretionary task list item, Yuri was to complete another radiation data monitoring & logging session for flow & dose power data with the Matryoshka-R radiation payload and its LULIN-5 electronics box (accumulated readings were recorded on a log sheet for subsequent downlink to TsUP/Moscow via the BSR-TM payload data channel).

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Later, Dan Tani copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~8:50am EST, the crewmembers held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

At ~9:40am, the FE-1 had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

### **Weekly Science Update** (Expedition Sixteen -- Weeks 5 & 6)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* From Week 5: The ALTEINO instrument has been rotated and re-activated nominally on 11/22. Subsequent downlink of the files has been performed nominally on 11/23. Radiation measurements continue to be performed throughout the Increment 16 in the PIRS module. From Week 6: Radiation measurements continue nominally in

the PIRS module.

*ANITA*: Completed.

*BCAT (Binary Colloidal Alloy Test)*: Reserve.

*CARDIOCOG-2*: Completed.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS)*: “Dan, next week your second and last on-orbit session will be hard scheduled. Thanks for participating and performing your first session as Voluntary Science”.

*CFE (Capillary Flow Experiment)*: Reserve.

*CSI-2/CGBA (CGBA Science Insert #2/Commercial Generic Bioprocessing Apparatus)*: In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2)*: Complete.

*CSLM-2 (Coarsening in Solid-Liquid Mixtures 2)*: The CSLM SPU (Sample Processing Unit) is currently under vacuum and should be ready to process on Monday.

*EarthKAM (Earth Knowledge Acquired by Middle School Students)*: Complete.

*ETD (Eye Tracking Device)*: In progress.

*Integrated Immune*: In progress.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*: Complete.

*MISSE (Materials ISS Experiment)*: Ongoing.

*MTR-2 (Russian radiation measurements)*: Passive dosimeters measurements in DC1 “Pirs”.

*MULTIGEN-1*: From Week 5: The EMCS (European Modular Cultivation System) Facility has been switched off on 11/15. MULTIGEN-1 samples will be downloaded on STS-122 (1E).

*MSG-SAME (Microgravity Science Glovebox)*: Complete.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION/REPOSITORY:* Dr. Whitson was thanked for completing her Flight Day 30 Nutrition/Repository collections: "We appreciate the crew notes with all of the barcode and hardware information, they were very helpful". Her next session is on FD60.

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* "Peggy, we have placed an Actiwatch download/initialization session on the task list for next week. This will include downloading and initializing the lost Actiwatch. Thanks for continuing to sleep log. And thanks also to Dan."

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* In progress. To be conducted tomorrow (12/2).

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 11/28 the ground has received a total of 4,017 CEO frames for review and cataloging for Increment 16. "That includes nearly 1,000 frames in the past week alone! We are focusing our efforts on 14 sessions in which you acquired imagery with camera times corresponding to our target request times: Acraman Impact Crater, Australia; Afar Rift Zone, Ethiopia (confirmed); Bosumtwi Impact Crater, Ghana; Gulf of Fonseca (confirmed), Central America; Heard Island, Southern Ocean; Honolulu, HI (confirmed); Kingman Reef & Palmyra Atoll, central Pacific (confirmed); Mississippi Delta Region (confirmed); Mount Nyiragongo, central Africa; Patagonian Glaciers (confirmed); Pilcomayo River dynamics, Argentina; Santa Barbara Coast, CA (confirmed); and Volcan Colima, Mexico (confirmed). This is an incredible response to our target requests! We have also noted with interest your views of cities at night (PAO has inquired about your very nice views of Chicago). We'd also like to acknowledge the striking views of Australia and New Zealand acquired on your time. Thank you for your energetic and enthusiastic support of our payload!"

CEO photo targets uplinked for today were **Heard Island** (*Heard Island is a bleak, uninhabited, and mountainous island located in the Southern Ocean; about two-thirds of the way from Madagascar to Antarctica. Its mountains are covered in*

glaciers and dominated by Mawson Peak, a 9,006 ft high complex volcano which forms part of the Big Ben massif. A long thin spit named "Elephant Spit" extends from the east of the island. As was the case yesterday, this pass was just after midday, however weather is marginal. Looking well right of track and using the long lens for details), **Goat Paddock Impact Crater** (this small, young impact site is located in northwestern Australia. It lies just north of the Great Sandy Desert and near where the Margaret River breaks out of the Kimberly Plateau. Although Goat Paddock is only 5.1-km in diameter it is less than 50 million years old and is a fairly distinct feature. ISS approach was from the SW in mid-afternoon light. Looking just left of track with the long lens), and **Patagonian Glaciers** (ISS pass was near nadir over the southern part of the Southern Patagonian Ice Field; the larger of two icefields in the southern Andes Mountains of Chile and Argentina. The crew had several passes over Patagonia today, but the weather looked to be best for a late morning pass. As the station approached the coast from the west, the crew was to look for views and details of the less-photographed glaciers on the western and southern flanks of the ice field).

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:25am EST [= epoch]):

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Period -- 91.32 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0000711

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01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]

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02/16/08 -- STS-123/Endeavour/1J/A docking

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/30/07  
**Date:** Friday, November 30, 2007 12:13:37 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/30/07**

All ISS systems continue to function nominally, except those noted previously or below.

As is standard for new Expeditions, the two Flight Engineers, Malenchenko & Tani, performed the periodic 3-hr. routine health checkout on the RS (Russian segment)'s STTS telephone/telegraph subsystem, including inspection and audio function checks of all comm panels (PA) in and between the Service Module (SM), FGB and Docking Compartment (DC1), VHF receiver tests, and an audit of headsets. *[The "Voskhod-M" STTS enables telephone communications between the SM, FGB, DC1 and U.S. segment (USOS), and also with users on the ground over VHF channels selected by an operator at an SM comm panel, via STTS antennas on the SM's outside. There are six comm panels in the SM with pushbuttons for accessing any of three audio channels, plus an intercom channel. Other modes of the STTS include telegraphy (teletype), EVA voice, emergency alarms, Packet/Email, and TORU docking support. Last time done 4/15/07 by Yurchikhin & Kotov.]*

Malenchenko also completed the 2-hr Part 2 of his first onboard "Profilaktika" (MBI-8, "Countermeasures") series of preventive health maintenance fitness testing, including ECG (Electrocardiogram), blood test and subjective rating. *[Today's fitness test was performed on the TVIS treadmill in unmotorized (idle) mode, with free choice of speeds within the range permitted. The test investigates the action mechanism and efficiency of various countermeasures (currently VELO and TVIS) aimed at preventing locomotor system disorders in weightlessness. The test differs from the normal TVIS session by the use of the TEEM-100 gas analyzer (via a mask equipped with a pneumotachometer sensor), measurement of blood lactate level and subjective evaluation of physical exertion levels during the test. The lactate blood samples were taken twice at the end of the session, using the ACCUSPORT analyzer and REFLOTRON-4 accessories. Results were entered on a log sheet. TEEM and ECG (electrocardiograph) data were transferred to the RSE-Med laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down via S-band to*

*specialists standing by at TsUP-Moscow.]*

Yuri made preparations for another run of the Russian/German TEKh-20 Plasma Crystal-3 Plus (PK-3+) experiment payload by unstowing the hardware, installing it in the SM for operation and photographing the setup. The images were downlinked to TsUP via OCA for inspection, and the FE-1 performed the initial leak check of the PK-3 Electronics Box. More work to come tomorrow. *[The experiment is performed on plasma, i.e., fine particles charged and excited by HF (high frequency) radio power inside an evacuated work chamber. Main objective is to obtain a homogeneous plasma dust cloud at various pressures and particle quantities with or without superimposition of an LF (low frequency) harmonic electrical field. The experiment is conducted in automated mode. PK-3+ has more advanced hardware and software than the previously used Russian PKE-Nefedov payload.]*

In the Joint Airlock, the CDR started the recharge cycle on the first batch of EMU (Extravehicular Mobility Unit) batteries in the BSA (Battery Stowage Assembly) following their discharge.

Dan Tani continued the daily servicing of the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment on its second session. *[Today, FE-2 terminated the second vacuum draw on the sample chamber and began the final vacuum draw for Sample #2. This draw will run over the weekend, and sample processing will then begin on Monday.]*

In the Soyuz TMA-11/15S, docked to the FGB Nadir port, the FE-1 deactivated the gas analyzer that was running since 11/28.

After partially pressurizing the PMA-2 (Pressurized Mating Adapter 2) to 5 psia on 11/28, CDR Whitson today performed a leak check on the adapter using the installed test equipment (ISA/Internal Sampling Adapter, VAJ/Vacuum Access Jumper, Multimeter and ISA Scopemeter Pressure Probe), then initiated the depressurization of PMA-2 to vacuum until its planned repressurization on 12/7 for 1E docking. The equipment was torn down and stowed.

Peggy Whitson completed late-added preparations for a second overnight Fine Leak Check on the Lab-to-Node-2 vestibule, temporarily removing the IMV (Intermodular Ventilation) supply-&-return jumpers, two ducts and four O-rings, then initiating the vestibule depress. *[The test repetition was requested by ground specialists because of inconclusive results of the first 15-hour leak check on the Lab/Node-2 vestibule on 3/27, which appeared to indicate a leak to space of ~3-4 lbs/day but could not be confirmed by a Coarse Leak check or by Whitson with the ULD (Ultrasonic Leak Detector) on 11/28 and may have been a false alarm.]*

Due to the late-added vestibule leak check, the scheduled monthly (Week 6) potable water sampling for inflight & post-flight chemical analysis for the CDR was moved to her discretionary “job jar” task list. *[Water samples are collected using jointly approved Russian sampling procedures with the U.S. WS&A (Water Sampler & Archiver) kit for collection. Samples are taken in the SM at the potable water SRV-K hot port and SRV-K warm port and from CWCs (Contingency Water Containers) for the SVO-ZV water supply system.]*

Yuri Malenchenko made preparations and set up equipment for tomorrow’s scheduled semi-annual inspection and photo-documentation of Service Module (SM) windows, tagging up with ground specialists. To check for new defects, photographs of the window panes will be recorded, along with text files, on the RSK1 laptop for subsequent downlink via U.S. OCA assets. *[Objective of the inspection, using digital still camera (Nikon D1X w/SB-28DX flash), voice recorder and a flaw log, is to assess the pane surfaces on SM windows 6, 7, 8, 12, 13 for any changes (new cavities, scratches, new or expanded old stains or discolorations affecting transparency properties) since the last inspection, performed by Oleg Kotov on 6/26/07. The new assessment will be compared to the earlier observations.]*

Dan Tani performed his 6<sup>th</sup> ICEPAC insertion in the MELFI (Minus Eighty-Degree Laboratory Freezer for ISS), retrieving one -32 degC ICEPAC belt from stowage and placing it in Dewar 1/Tray B/Section 4. *[The reason the crew is currently performing several ICEPAC insertions is because the amount of warm mass that can be placed in a dewar at one time is limited by the allowable temperature rise. These activities are in preparation for the next Cold Bag packing, planned for STS-122/1E.]*

The FE-2 filled out the regular FFQ (Food Frequency Questionnaire), his 4<sup>th</sup>, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. At TsUP/Moscow, food specialists are currently preparing the Russian food “menu” for delivery by Progress M-63/28P next February. 28P will carry “bonus food” for Peggy and Yuri, plus about 15 kg of fresh food items (apples, grapefruit, oranges, lemons, garlic) in two containers.]*

In preparation for 1E, Peggy & Dan performed the usual one-hour review of new uplinked DOUG (Dynamic Onboard Ubiquitous Graphics) software for tomorrow’s standard pre-launch SSRMS (Space Station Remote Manipulator System) checkout

activities. *[As part of tomorrow's checkout, the SSRMS will be maneuvered to the position required for 1E by "walking off" the Lab PDGF (Power & Data Grapple Fixture), grappling the Node-2 PDGF for base change, releasing the Lab PDGF and its joints then moved by JOCAS (Joint Operator Commanded Auto Sequence) through two "waypoints" to the 1E start position. DOUG is a periodically updated software program on the MSS (Mobile Service System) laptops that provides a birdseye-view graphical image of the external station configuration and the SSRMS arm, showing its real-time location and configuration on a laptop during its operation.]]*

The crew prepared for STS-122/Atlantis arrival next week by conducting a joint review of cargo transfer requirements (resupply deliveries & return cargo) by going through uplinked draft material on transfer choreography ("who transfers what on which Flight Day") and transfer items.

Dan Tani handled the daily routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables. *[Regular daily SOZh maintenance consists among else of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

The daily IMS (Inventory Management System) maintenance was conducted today by Yuri Malenchenko again as a task item from his voluntary "time permitting" job list, updating/editing its standard "delta file" including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (FE-1/MBI-8, FE-2), and RED resistive exerciser (CDR, FE-2).

Later, Peggy Whitson copied the exercise data file to the MEC laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~8:40am EST, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~10:55am, the FE-2 had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground

video on the SSC-9 laptop).

At ~2:45pm, the crew is scheduled for their 4<sup>th</sup> weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio [S/G-2 (*Space-to-Ground 2*) phone patch via SSC-10 (*Station Support Computer 10*)].

*SARJ Issue Update:* Deliberate investigation and strategic planning continue on the ground on the ramifications of the observed damage on the starboard SARJ (Solar Alpha Rotary Joint) bearing. Work in progress includes consideration of possibly manifesting 12 new TBAs (Trundle Bearing Assemblies) on STS-123/1J/A next February, removing, but not immediately replacing, one TBA on one of the 1E EVAs (i.e., operating SARJ in directed position on only 11 of the 12 TBAs), and much more.

CEO (*Crew Earth Observation*) photo targets uplinked for today were **Lawn Hill Impact Crater** (*this impact site is estimated to be 515 million years old and has been heavily weathered to where what is visible is a very subtle 18-km in diameter feature. It is located just inland from the Gulf of Carpentaria in northern Australia. ISS approach was from the SW in late afternoon sun which may have helped to accentuate the remaining features of the impact in the near-nadir view. Because this feature is so indistinct, it may not actually be visible to the crew, but they simply were to try for a contextual mapping swath over this area, with ground observers then trying to locate it*), **S. Georgia/S. Sandwich** (*South Georgia Island is an arching, mountainous and glaciated island that lies about 860 miles ESE of the Falkland Islands. The South Sandwich Islands form a separate island group and are to the SE. Weather is marginal with the islands near the NW edge of an extensive cloud field. The crew was to try for detailed views of the glaciers on the north coast of South Georgia*), and **Patagonian Glaciers** (*ISS pass was near nadir over the central part of the Southern Patagonian Ice Field; the larger of two icefields in the southern Andes Mountains of Chile and Argentina. A strong cold front is moving through the region today and clearing from the W is expected tomorrow. As the station approached the coast from the SW just after midday, the crew was to shoot views and details of the less-photographed glaciers on the western flanks of the ice field*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:37am EST [= epoch]):

Mean altitude -- 339.2 km

Apogee height -- 339.8 km

Perigee height -- 338.7 km

Period -- 91.32 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0000804

Solar Beta Angle -- 29.5 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 102 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51702

**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite, ~4:31pm EST

12/08/07 -- STS-122/Atlantis/1E docking, ~1:15pm

- o 12/09 -- EVA-1 (Walheim/Schlegel), ~11:28am, 6.5h

- o 12/09 -- Columbus transfer & berthing @ Node-2, ~5:30pm

- o 12/10 -- Columbus ingress, ~5:08pm

- o 12/11 -- EVA-2 (Walheim/Schlegel), ~11:28am, 6.5h

- o 12/13 -- EVA-3 (Walheim/Love), ~10:25am, 6.5h

12/15/07 -- STS-122/Atlantis undocking, ~8:22am

12/17/07 -- STS-122/Atlantis landing ~12:29pm EST

12/22/07 -- Yuri Malenchenko's Birthday

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/26/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour undocking

02/29/08 -- STS-123/Endeavour landing

03/01/08 -- Progress M-62/27P undocking (DC1) & reentry

03/06/08 -- ATV-1 docking (SM aft port)

04/07/08 -- Progress M-63/28P undocking (DC1) & reentry

04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)

04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **50<sup>th</sup> Birthday of NASA**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch.**

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[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/29/07  
**Date:** Thursday, November 29, 2007 1:14:19 PM  
**Attachments:**

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### **ISS On-Orbit Status 11/29/07**

All ISS systems continue to function nominally, except those noted previously or below.

Upon wakeup, FE-1 Malenchenko terminated his third MBI-12 SONOKARD experiment session by taking the recording device from his SONOKARD sports shirt pocket and later copying the measurements to the RSE-MED laptop for subsequent downlink to the ground. *[SONOKARD objectives are stated to (1) study the feasibility of obtaining the maximum of data through computer processing of records obtained overnight, (2) systematically record the crewmember's physiological functions during sleep, (3) study the feasibility of obtaining real-time crew health data. Investigators believe that contactless acquisition of cardiorespiratory data over the night period could serve as a basis for developing efficient criteria for evaluating and predicting adaptive capability of human body in long-duration space flight.]*

Before breakfast, CDR Whitson, Malenchenko and FE-2 Tani performed the periodic Russian biomedical routine assessments PZEh-MO-7/Calf Volume Measurement and PZEh-MO-8/Body Mass Measurement (3<sup>rd</sup> for CDR & FE-1, 2<sup>nd</sup> for FE-2), using the IM mass measurement device which Malenchenko afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

Yuri also completed a 2-hr session of Part 1 of his first onboard "Profilaktika" (MBI-

8, "Countermeasures") series of preventive health maintenance fitness testing, starting with the VELO stationary cycle ergometer. *[Tomorrow (11/30), Yuri will do the second part of the test on the TVIS treadmill. Test procedure for MBI-8 is identical to the Russian MO-5 assessment, but in addition to the nominal protocol it uses the TEEM-100M gas analyzer with breathing mask, a blood lactate test with the ACCUSPORT analyzer and REFLOTRON-4 accessories, and a subjective evaluation of physical exertion levels during the test (using the Borg Perceived Exertion Scale, viz., 10 steps from very light over hard and very hard to maximum). Results are entered on a log sheet. TEEM and ECG (electrocardiograph) data are transferred to the RSE-Med Laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]*

Peggy Whitson continued the daily servicing of the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment on its second session, which yesterday included successful ground-commanded reprogramming of the ECU (Electronic Control Unit). *[Today, the CDR reset the MSG WV (Microgravity Science Glovebox Work Volume) to its nominal configuration and opened the vent & vacuum valves to initiate the required vacuum draw on the sample chamber.]*

The crew worked through the regular Fire OBT (on-board training), a mandatory periodic one-hour drill with the primary goal of providing the station residents with the most realistic emergency training possible, supported by ground specialist tagup. The drill is always conducted with the support of both MCCs in close coordination. *[OBT objectives are to (a) practice fire response procedures (FRPs) and all incorporated actions for the case of a software-detected fire to locate, extinguish, and verify extinguishing attempts; (b) browse through RS laptop and the Signal-VM fire detection system displays as well as the automated software (algorithms) response to the fire event; (c) practice interaction/communication among the crew and with MCC necessary to perform emergency FRPs; and (d) update the locations of support hardware (CSA-CP compound specific analyzer-combustion products, PBA portable breathing apparatus, IPK-1M gas masks and OKR-1 fire extinguishers. Emergency procedures are documented in the EMER-1 and EMER-2 books. These exercises do not actually use any fire equipment but simulate such actions to the maximum extent possible. The OBT concluded with a 15-min. debrief with Russian/U.S. ground specialists via S-band at ~12:10pm EST.]*

Afterwards, the crew also performed the mandatory 90-min. New Module Delta Emergency Procedure drill, intended to familiarize the station residents with the changes associated with the arrival of a new module, to be conducted not later than 7-10 days after berthing. *[The OBT focused, among else, on identifying and memorizing the location of emergency equipment in Node-2 including hatches and passageways, and with changes to the emergency procedures associated with the*

*new module. Equipment and locations reviewed include PBAs and PBA O2 ports, PFEs (portable fire extinguishers), valves for positive & negative pressure relief, manual pressure equalization, and IMV (Intermodular Ventilation). With the arrival of Node-2 (and Columbus next week), more volume is available in the decision-making process regarding the use of the U.S. segment (USOS) atmosphere for Russian segment (RS) leaks (EMER-1).]*

FE-2 Tani reconfigured the Lab THC CCAA (Temperature & Humidity Control Common Cabin Air Assembly) air conditioner, swapping it from its portside channel to the alternate system on the starboard side of the Lab, then switching the ITCS LTL (Internal Thermal Control System/Low Temperature Loop) accordingly, i.e., from port to starboard. *[The CCAA is a network of ducting that draws in the air through filters, delivers it for conditioning, and returns it to the modules. The swap-over between the CCAA channels is generally done by the crew once a month, with ground support, to dry out the heat exchanger of the deactivated side. MCC-H commands the required systems configurations for the dryout via S-band.]*

After reviewing the video tape of their last (Thanksgiving Day) training session for the Shuttle RPM (R-bar Pitch Maneuver) picture-taking, Whitson and Malenchenko conducted another standard 30-min RPM imaging skill training, Peggy's fourth, Yuri's fifth, using DCS-760 digital still cameras in the Service Module (SM) to take photos of an Orbiter cut-out for practice, using the 400mm & 800mm telephoto lenses. *[The skill training prepares crewmembers for the bottomside mapping of the Orbiter at the arrival of STS-122/1E next week. During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Atlantis from SM windows 6 & 8, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

Afterwards, Whitson worked with the DCS-760 still cameras, taking blank and white images with each camera to "clean" and calibrate the CCDs (Charge-Coupled Devices). The test photos were stored on a 1GB Microdrive PCMCIA and downlinked to MCC-Houston for determining which cameras will be used for the actual RPM activities.

In the Joint Airlock (A/L), the CDR continued the daily troubleshooting of the leaking UIA (Umbilical Interface Assembly)'s O<sub>2</sub> supply line by mating PHA (Prebreathe Hose Assembly) "Tee" connectors to one PHA port at a time, in order to determine which of them is leaking as well as what type of leakage that PHA port is experiencing. *[Each setup takes about 5 min, followed by ~24 hours of unattended test.]*

Dan Tani performed his fifth ICEPAC insertion in the MELFI (Minus Eighty-Degree Laboratory Freezer for ISS), retrieving two more -32 degC ICEPAC belts from stowage and placing them in Dewar 2/Tray C/Section 4 & Tray D/Section 4. *[The reason the crew is currently performing several ICEPAC insertions is because the amount of warm mass that can be placed in a dewar at one time is limited by the allowable temperature rise. These activities are in preparation for the next Cold Bag packing, planned for STS-122/1E.]*

Peggy Whitson conducted the weekly 10-min. CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card, to be updated with today's data, lists 26 CWCs ~1093 liters total) for the four types of water identified on board: technical water (793.6 l, for Elektron, flushing, hygiene), potable water (221.3 l), condensate water (51.5 l), waste/EMU dump and other (26.6 l). Two CWCs (#1004 & #1081, ~89 l) with potable water have been put off limits due to the Wautersia bacteria found in sample analysis, the source of which is still not understood. Impact of losing this potable CWC is negligible since there are sufficient drinking water supplies onboard. Also currently not to be used are nine CWCs with technical water (~389 l).]*

Malenchenko conducted the second recharging of the Motorola Iridium-9505A satellite phone brought up on Soyuz 15S, a monthly routine job. *[After retrieving it from its location in the TMA-11/15S descent module (BO) at ~3:35am EST, Yuri initiated the recharging of its lithium-ion battery, monitoring the process every 10-15 minutes as it took place. Upon completion at ~5:00am, the phone was returned inside its SSSP Iridium kit and stowed it back in the BO's operational data files (ODF) container. The satphone accompanies returning ISS crews on Soyuz reentry & landing for contingency communications with SAR (Search-and-Rescue) personnel after touchdown (e.g., after an "undershoot" ballistic reentry). The Russian-developed procedure for the monthly recharging has been approved jointly by safety officials. During the procedure, the phone is left in its fire-protective fluoroplastic bag with open flap.]*

The FE-1 completed the daily routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including ASU toilet facilities systems/replaceables. *[Regular daily SOZh maintenance consists among else of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Yuri also conducted the daily IMS (Inventory Management System) maintenance, updating/editing its standard "delta file" including stowage locations, for the regular

weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1/MBI-8).

Later, Peggy copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The FE-2 transferred the video footage of yesterday's TVIS workout from camcorder to VTR (Video Tape Recorder) for subsequent downlink to the ground via Ku-band, swapped tapes between VTR1 & VTR2 and then disassembled and stowed the video equipment.

In preparation for the upcoming EVAs during the STS-122 docked period, the CDR spent time in the A/L with her camcorder to record a video tour of the interior layout, for review by the 1E spacewalkers for their familiarization with current equipment locations, etc.

At ~3:50am, Yuri linked up with TsUP stowage specialists via S-band to conduct the weekly IMS tagup, discussing stowage issues and equipment locations. *[Issues of discussion today included the stowage location of Elektron water samples collected on 11/23 and any vacant stowage spots in the FGB for cargo to be delivered on the next Progress (M-62/27P).]*

At ~1:40pm, the crew will participate via S-band/audio phone patch in the traditional official plaque hanging in ISS Mission Control/Houston for the Mission 10A Plaque.

Afterwards, ~2:25pm, Peggy, Dan and Yuri will conduct their standard bi-weekly teleconference with the JSC Astronaut Office (Steve Lindsey), via S-band S/G audio.

*PMA-2 Leak Test:* The PMA-2 (Pressurized Mating Adapter 2), now that it has been berthed to Node-2 Forward, was pressurized yesterday by the crew to 5 psia for a leak check and is currently still in the required 24-hour hold.

*CEO (Crew Earth Observation) photo targets uplinked for today were **S. Georgia/S. Sandwich** (South Georgia Island is an arching, mountainous and glaciated island that lies about 860 miles ESE of the Falkland Islands. The South Sandwich Islands*

form a separate island group and are to the SE. Weather satellite imagery suggested a clearing trend from the west by the time of this ISS pass, late in the morning. The crew was asked to try for detailed views of the glaciers on the north coast of South Georgia, right of track), **and Patagonian Glaciers** (ISS pass was near-nadir over the northern part of the Southern Patagonian Ice Field, the larger of two icefields in the southern Andes Mountains of Chile and Argentina. As the station approached the coast from the SW in late morning light, the crew was to look for views and details of the less-photographed glaciers on the northwestern and northern flanks of the ice field).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:16am EST [= epoch]):

Mean altitude -- 339.3 km

Apogee height -- 340.0 km

Perigee height -- 338.7 km

Period -- 91.32 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0000952

Solar Beta Angle -- 30.1 deg (magnitude peaking)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 102 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51686

**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite, ~4:31pm EST

12/08/07 -- STS-122/Atlantis/1E docking, ~1:15pm

○ 12/09 -- EVA-1 (Walheim/Schlegel), ~11:28am, 6.5h

○ 12/09 -- Columbus transfer & berthing @ Node-2, ~5:30pm

○ 12/10 -- Columbus ingress, ~5:08pm

○ 12/11 -- EVA-2 (Walheim/Schlegel), ~11:28am, 6.5h

○ 12/13 -- EVA-3 (Walheim/Love), ~10:25am, 6.5h

12/15/07 -- STS-122/Atlantis undocking, ~8:22am

12/17/07 -- STS-122/Atlantis landing ~12:29pm EST

12/22/07 -- Yuri Malenchenko's Birthday

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A, ~11:53am, w/SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/01/08 -- Progress M-62/27P undocking (DC1) & reentry  
03/06/08 -- ATV-1 docking (SM aft port)  
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04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
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08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **50<sup>th</sup> Birthday of NASA**  
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04/??/09 -- **Six-person crew on ISS**  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/28/07  
**Date:** Wednesday, November 28, 2007 2:28:28 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/28/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-2 Dan Tani continued servicing the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment on its second session. *[The FE-2 configured the hardware to allow the ground to perform ground commanding to the MLC (Microgravity Science Glovebox Laptop Computer) for diagnostic testing and to develop recovery steps for the ECU (Electronic Control Unit) to be reprogrammed correctly.]*

FE-1 Yuri Malenchenko performed a thorough 2-hr. troubleshooting inspection & verification of the connections of the Russian segment's Onboard Cabling System (BKS) to the FGB's Thermal Control System (SOTR). *[Using the Nikon D200 digital camera, Yuri documented the SOTR layout behind panel 215 and checked connector pins for dirt or misalignment.]*

Later, Malenchenko prepared for the upcoming activation of the Russian/ESA BIO-3 experiment payload by conducting a search for a suitable PCMCIA (Portable Computer Memory Card International Adapter) storage card. *[A new PCMCIA card is required for BIO-3 due to the loss of an earlier PCMCIA with BLOKIN, AT-Space and P-KINASE data. BIO-3, delivered on Soyuz 15S, is the latest in a series of ESA's BIO payload system which makes use of the KUBIK incubator facility, currently the "facility of choice" for this program. BIO-1, delivered on 12S (March 2006) comprised six experiments that gave almost 100% of expected output. BIO-2 followed in the second half of 2006 as part of the ESA Astrolab mission aboard ISS, with the three experiments LEUKIN-2, BASE-A, and YING-A. In support of LEUKIN, new payload deliveries included the PGB (Portable Glovebox) for containment. The new BIO-3 will include three separate experiments. Development of BIO-4 is underway.]*

After the overnight fine leak check of the Lab/Node-2 vestibule and Node-2 aft hatch interface, CDR Whitson spent about 20 min. on terminating the check,

repressurizing the vestibule and ingressing the Node-2. *[The leak check indicated slight leakage, i.e., an observed pressure decay of 95.8 mmHg over 15 hrs 16 min, which is above the 30 mmHg criterion over an 8-hour period. This equates to ~0.7 lbs of air per day at 3.3 psi, and ~3.1 lbs per day at 14.7 psi.]*

Continuing Node-2 interior outfitting, Whitson then installed the IMV (Intermodular Ventilation) valve jumper in the vestibule, opened Harmony's starboard hatch latches to their hardstop position to test the mechanism (hatch remaining safely closed due to pressure differential), and deployed two new SSCs (Station Support Computer) laptops in Node-2 (SSC-11 & SSC-12).

Also in Node-2, FE-2 Tani installed and checked out the CBCS (Centerline Berthing Camera System) at the starboard hatch in preparation for Columbus' berthing during 1E, after rerouting the necessary power line from UOP-3 (Utility Outlet Panel 3) in Node-2 to a Y-cable disconnected from the failed UOP-1. *[The electronics extension cable from the CBCS was then disconnected to avoid its hatch dragthrough for safety.]*

Peggy meanwhile worked in the Joint Airlock (A/L) on preparations for the 1E spacewalks, by –

- Removing LiOH (Lithium Hydroxide) CO<sub>2</sub> absorber cans #2016 & #2023 from EMUs (Extravehicular Mobility Units) #3018 & 3006,
- Plugging vent ports in the EMUs and capping the LiOH openings,
- Prepacking the used LiOH cans for return to Earth,
- Resizing EMU #3018 for Stan Love (EV3 on 1E),
- Continuing gathering EVA tools required during the spacewalks, and
- Checking out three PGTs (Pistol Grip Tools), replacing batteries as necessary.

Yuri Malenchenko inspected the KOV de-ionized water container (EDV), used for supplying water to the Elektron oxygen (O<sub>2</sub>) generator for electrolysis, for bubbles and possible need for filling up with U.S. condensate from a CWC (Contingency Water Container). *[Air bubbles larger than ~10 mm in the water must be prevented from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Afterwards, Yuri supported the ground's reactivation of the Elektron O<sub>2</sub> generator at 32 amps by monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. Yesterday, the FE-1 had installed an EMI (Electro-Magnetic Interference) filter on the Elektron's current stabilizer (FPP ST-64). *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause*

*overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Malenchenko set up the hardware and took a “refresher” course of the onboard “Profilaktika” (MBI-8, “Countermeasures”) preventive health maintenance fitness test, scheduled to start tomorrow and running through Friday. *[Test procedure for MBI-8, which requires workouts on the VELO and TVIS, is identical to the Russian MO-5 assessment, but in addition to the nominal procedure it uses the TEEM-100M gas analyzer with breathing mask, a blood lactate test with the ACCUSPORT analyzer and REFLOTRON-4 accessories, and a subjective evaluation of physical exertion levels during the test (using the Borg Perceived Exertion Scale, viz., 10 steps from very light over hard and very hard to maximum). Results are entered on a log sheet. TEEM and ECG (electrocardiograph) data are transferred to the RSE-Med Laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results are also called down to specialists standing by at TsUP.]*

As part of his regular physical fitness evaluation, the FE-1 undertook the Russian MO-5 MedOps protocol of cardiovascular assessment during graded physical load on the VELO cycle ergometer, his first, assisted by his CDR as CMO (Crew Medical Officer). *[The assessment uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph cuff wired to the cycle ergometer's instrumentation panels. For the graded-load exercise, the subject works the pedals after a prescribed program at load settings of 125, 150, and 175 watts for three minutes each. Data output involves a kinetocardiogram, rheoplethysmogram, rheoencephalogram and a temporal pulsogram.]*

Dan Tani sampled the Node-2 atmosphere by collecting air samples with the MAS (Microbial Air Sampler) kit at mid-module and later also by using the SSK (Surface Sample Kit) for sampling at locations near air diffusers. *[Bacterial and fungal air samples are usually taken at two locations in the module being checked. The colony growth on the MAS sampling slides is analyzed after five days of incubation in four Petri dishes. For onboard visual analysis of media slides from SSK (Surface Sampling Kit), the crew has a procedure for visual inspection of samples for bacterial and fungal colony growths after appropriate incubation periods.]*

Yuri performed the periodic activation of the gas analyzer in the Soyuz TMA-11/15S, docked to the FGB Nadir port.

Dan ran the periodic check of active U.S. payloads, i.e., cleaning the ANITA (Analyzing Interferometer for Ambient Air) inlet plus inspecting and filter cleaning of the CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to*

*Earth.]*

At ~1:05pm EST, Peggy and Yuri tagged up with ground specialists to discuss the downlinked imagery from their recent RPM (R-Bar Pitch Maneuver) photo/video operations.

Later today, at sleeptime, Malenchenko will start another data take with the new Russian MBI-12 SONOKARD (Sonocard) experiment, his fourth. *[During sleep, Yuri will wear a shirt with the special SONOKARD device in the shirt pocket. The objectives of the experiment are stated to (1) study the feasibility of obtaining the maximum of data through computer processing of records obtained overnight, (2) systematically record the crewmember's physiological functions during sleep, (3) study the feasibility of obtaining real-time crew health data. Investigators believe that contactless acquisition of cardiorespiratory data over the night period could serve as a basis for developing efficient criteria for evaluating and predicting adaptive capability of human body in long-duration space flight.]*

The FE-1 completed the daily routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including ASU toilet facilities systems/replaceables. *[Regular daily SOZh maintenance consists among else of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

Yuri also conducted the daily IMS (Inventory Management System) maintenance again as a voluntary task from his "time permitting" discretionary task list, updating/editing its standard "delta file" including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Dan Tani's treadmill workout was recorded by video camcorder for biomechanical assessment of the hardware status by ground engineers. Peggy and Yuri had their video sessions yesterday. Afterwards, the CDR transferred the footage from camcorder to VTR (Video Tape Recorder) for subsequent downlink to the ground via Ku-band.

Dan also copied the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done

six times a week).

At ~1:35pm, the FE-2 supported two live “crew choice” PAO TV interview exchanges with two stations in Chicago, WFLD-TV (Patrick Elwood) and WLS Radio (Jerry Agar).

*Array Deflection Test:* At ~1:08pm, MCC-H conducted a remote-commanded deflection test on U.S. solar arrays due to thermal dynamics during insolation & eclipse (orbital day & night). The Channel 1A array was parked for about 30 min., and video of the array motion was captured by MSS (Mobile Service System) cameras. No exercise was allowed during this time.

*Voluntary Weekend Science:* Five optional activities for the voluntary “Saturday Science” program for next weekend (12/2) were suggested to Peggy and Dan for their choice. Selection is required ASAP. [The five choices are: (1) SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites), flying two & three satellites, requiring 2 video camcorders & 2 VTRs; (2) EPO (Educational Payload Operation) ISS Tour/Living Area Demo; (3) HRF 1 RIC (Human Research Facility 1 Rack Interface Controller) software load; (4) BCAT-3 (Binary Colloidal Alloy Test-3) Magnet Unstick, using the CGBA-4 (Commercial Generic Bioprocessing Apparatus-4), powered up 12 hrs before to initiate cooling; and (5) CGBA/CSI-02 (Commercial Generic Bioprocessing Apparatus Science Insert 2), sowing PDA (Plant Development Habitat) with new seeds]

*Node-2 ISL Router Installation:* “Ping” tests onboard and now also from the ground have shown that Dan Tani’s completion of ISL (Integrated Station LAN) installation in Node-2 yesterday was a success.

**CEO (Crew Earth Observation)** photo targets uplinked for today were **Heard Island** (*Heard Island is a bleak, uninhabited, and mountainous island located in the Southern Ocean; about two-thirds of the way from Madagascar to Antarctica. Its mountains are covered in glaciers and dominated by Mawson Peak, a 9,006 ft high complex volcano which forms part of the Big Ben massif. A long thin spit named "Elephant Spit" extends from the east of the island. ISS pass was just before midday with weather satellite imagery suggesting clearing from the west. Looking well right of track and using the long lens for details*), **Kerguelen** (*this glaciated and volcanic archipelago is located in the far south Indian Ocean nearly 2,000 miles SE of the island of Madagascar. Of primary interest is photography for monitoring of the rarely photographed ice field and glaciers located on the western end of the main island. ISS had a nadir pass approaching from the west in mid-afternoon light. Trying for a mapping pass of the western ice field*), and **S. Georgia/S. Sandwich** (*the South Georgia Island is an arching, mountainous and glaciated island that lies about 860 miles east-southeast of the Falkland Islands. The South*

*Sandwich Islands form a separate island group and are to the SE. Weather was marginal, but the crew was to try for detailed views of the glaciers on the north coast of South Georgia. ISS pass was in late morning, and the crew was to shoot well right of track).*

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/27/07  
**Date:** Tuesday, November 27, 2007 2:21:44 PM  
**Attachments:**

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### **ISS On-Orbit Status 11/27/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, Dr. Whitson completed the last day of her 2<sup>nd</sup> session with the NASA/JSC experiment NUTRITION w/Repository (Peggy's third session will be on her Flight Day 60). Today she collected another urine sample for storage in the MELFI (Minus-Eighty Laboratory Freezer for ISS). The sampling kit was then stowed away. *[The current NUTRITION project expands the previous Clinical Nutritional Assessment profile (MR016L) testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

FE-1 Malenchenko worked several hours on the Service Module (SM)'s fire warning system, removing and replacing all ten SIGNAL-VM DS-7A smoke detectors, which were expired. The SIGNAL-VM system was deactivated from the ground beforehand and later turned on again. *[The ten DS-7A units were replaced last by Mikhail Tyurin and Mike Lopez-Alegria on 12/28/06 on Expedition 14.]*

Later, Malenchenko performed outfitting on the Elektron O<sub>2</sub> (Oxygen) generator to improve its performance, by installing a new device -- an interference filter (FPP ST-64) -- between the Elektron Liquid Unit (BZh) and the associated Common Power Switching Unit (BSK) of the SUBA (Onboard Equipment Control System). *[SUBA controls, monitors, and diagnoses SM systems status. It operates using sensor output signals and command radio link SM functional outputs, onboard computer system (BVS) units, SM control panels, and system relay outputs. Its software resides in the SM central computer (TsVM) and terminal computer (TVM). The BSKs are used to switch electrical power and protect electrical circuits with fuses against overloads.]*

A third maintenance task for Yuri in the Russian Segment (RS) was to check out the

cable of an air filter (A-2) in the FGB's Fire Detection & Suppression System (SPOPT).

Dan Tani continued his servicing of the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment on its second session. *[In Step 1, the FE-2 configured the MSG (Microgravity Science Glovebox) facility, closed the vacuum vent, checked for acceptable humidity levels, and opened the SPU (Sample Processing Unit) water valve to initiate unattended vacuum preparation. Later, in Step 2, he reset MSG, closed the water valve, again checked for acceptable humidity levels in the sample chamber, then opened the vent & vacuum valves to initiate the required vacuum draw on the sample chamber.]*

Since the CDRA (Carbon Dioxide Removal Assembly) was deactivated overnight by the ground (9:25pm-2:25am) and LTL temperature setpoint raised to nominal, with cooling is no longer required, Peggy Whitson today disconnected the LTL (Low Temperature Loop) jumper of the ITCS (Internal Thermal Control System) from the CDRA rack. *[Cabin temperature in Node-2 was set to 21 degC.]*

The CDR and FE-2 continued their interior outfitting of Node-2. With Harmony's aft NPRV (Negative Pressure Relief Valve) already replaced (on 10/28) with an IMV (Intermodular Ventilation) valve, Tani today first subjected the Node's IMV to a checkout, in particular the correct function of its aft port & starboard IMV valves and caution annunciations.

Afterwards, Peggy & Dan performed "plumbing" work on the "vestibule" space connecting Lab and Node-2 by installing O<sub>2</sub> and N<sub>2</sub> (Nitrogen) transfer jumpers.

Later, the CDR set up the Node-2/Lab vestibule for depressurization and leak checking, uncapping both PPRVs (Positive Pressure Relief Valves). *[Starting the outfitting with connecting the high-pressure O<sub>2</sub> jumper at the vestibule's Node-2 side (to be followed later on 1E by the Lab-side connection plus purging and leak checking), the crewmembers then installed and connected the low-pressure O<sub>2</sub> & N<sub>2</sub> jumpers, finally purging the hoses. The purge-and-leak check activity on the O<sub>2</sub> lines was conducted remotely from MCC-H, first commanding the low-pressure O<sub>2</sub> supply valve closed to vent down the lines, then purging the vestibule O<sub>2</sub> jumpers, followed by a fine leak check, and concluding with reopening of the supply valve. The O<sub>2</sub> PBA (Portable Breathing Apparatus) ports were not available during that time.]*

The FE-2 had 2 hrs. reserved for working in Node-2 to complete the task of connecting its ISL (Integrated Station LAN) Router, which he had started on 11/2

prior to Harmony's relocation to the Lab front end. *[The Payloads LAN connection is at the base of AV-3 (Avionics Rack 3, LAB1D2) where Clay Anderson on 9/12 had repositioned two connectors. ISL is an upgraded onboard LAN (Local Area Network) utilizing Ethernet connectivity over the Router via cable or WAP (Wireless Access Point). JSL is the designation for the overall network, including IP (International Partner) hardware and integration, while ISL refers to specifically US hardware. JSL/ISL integrates all ISS "user" devices, eventually including RS docking video distribution, payload comm & downlink (from IP modules, e.g., Columbus or Kibo), crew operations, procedures viewing, email, IP phone, etc. JSL/ISL eliminates drag-through cables in hatches, will be up to ten times faster than the current OpsLAN, and has provisions for future modules.]*

After the installation, Dan Tani printed out uplinked ISL port mapping labels, then used tape and a protective transparency to affix the sheet on a Node-2 rack cover next to the Lab ISL Interface Panel.

Whitson meanwhile set up the Node-2/Lab vestibule for depressurization & leak checking, uncapping both PPRVs (Positive Pressure Relief Valves).

The CDR spent 2.5 hrs in the Joint Airlock (A/L) gathering U.S. EVA tools in preparation for use during the 1E spacewalks by Walheim, Schlegel and Love. *[Tool locations and stowage places of unused tools were uplinked in a matrix table listing stowage places of deployed and unused tools, a staging bag and an IV (Intravehicular) bag in the A/L CL (Crewlock), a tether staging area, and other A/L locations. The work included configuring a mesh bag for EVA-2 containing a round scoop, plus another mesh bag for EVA-3 with two handrails. EVA-1 preps were been done earlier.]*

Peggy also continued the four-day troubleshooting of the leaking UIA (Umbilical Interface Assembly)'s O<sub>2</sub> supply line in the A/L by mating PHA (Prebreathe Hose Assembly) "Tee" connectors to one PHA port at a time, in order to determine which of them is leaking as well as what type of leakage that PHA port is experiencing. *[Each setup takes about 5 min, followed by several hours of unattended test.]*

Additionally, Whitson terminated the discharge cycle on the second batch of EMU (Extravehicular Mobility Unit) batteries, controlled by an automated SSC (Station Support Computer)-based DOS application.

FE-2 Dan Tani conducted the periodic (every two weeks) inspection of the RED (Resistive Exercise Device) canister cords and accessory straps as well as the canister bolts for re-tightening if required.

The CDR performed the regular monthly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), inspecting the condition of harnesses, belt slats, corner bracket ropes, IRBAs (Isolation Restorative Bungee Assemblies) and gyroscope wire ropes for any damage or defects, lubricating as required plus recording time & date values.

Peggy Whitson also configured the video equipment in the SM for filming Yuri's and her own subsequent TVIS workout, for biomechanical assessment of the hardware status by ground engineers. *[Dan Tani's TVIS video session is scheduled tomorrow. The footage from the three sessions will then be transferred from camcorder to VTR (Video Tape Recorder) for subsequent downlink to the ground when Ku-band is available.]*

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Tani transferred the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Malenchenko completed the daily routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including ASU toilet facilities systems/replaceables. *[Regular daily SOZh maintenance consists among else of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

The FE-1 also conducted the daily IMS (Inventory Management System) maintenance again as a voluntary task from his "time permitting" discretionary task list, updating/editing its standard "delta file" including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

**CEO (Crew Earth Observation)** photo targets uplinked for today were **Heard Island** *(Heard Island is a bleak, uninhabited, and mountainous island located in the Southern Ocean; about two-thirds of the way from Madagascar to Antarctica. Its mountains are covered in glaciers and dominated by Mawson Peak, a 9,006 ft high complex volcano which forms part of the Big Ben massif. A long thin spit named "Elephant Spit" extends from the east of the island. ISS pass was just before midday with weather satellite imagery suggesting clearing from the west. Looking well right of track and using the long lens for details),* and **Acraman Impact Crater**

*(this 590 million year old impact is located in the north central part of the Eyre Peninsula of southern Australia. It is approximately 90km in diameter and its basin includes several dry to partially dry lakes. Station pass was in late afternoon so the crew was to try for a short lens, nadir mapping strip over the target area).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:46am EST [= epoch]):

Mean altitude -- 339.6 km

Apogee height -- 340.3 km

Perigee height -- 338.8 km

Period -- 91.33 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0001119

Solar Beta Angle -- 29.7 deg (magnitude increasing, to peak on 11/28 at 30.2 deg)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 115 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51654

**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

11/28/07 -- ISS Reboost (SDMS taking data)

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite, ~4:31pm EST

12/08/07 -- STS-122/Atlantis/1E docking, ~1:15pm

○ 12/09 -- EVA-1 (Walheim/Schlegel), ~11:28am, 6.5h

○ 12/09 -- Columbus transfer & berthing @ Node-2, ~5:30pm

○ 12/10 -- Columbus ingress, ~5:08pm

○ 12/11 -- EVA-2 (Walheim/Schlegel), ~11:28am, 6.5h

○ 12/13 -- EVA-3 (Walheim/Love), ~10:25am, 6.5h

12/15/07 -- STS-122/Atlantis undocking, ~8:22am

12/17/07 -- STS-122/Atlantis landing ~12:29pm EST

12/22/07 -- Yuri Malenchenko's Birthday

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/26/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]

02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/01/08 -- Progress M-62/27P undocking (DC1) & reentry  
03/06/08 -- ATV-1 docking (SM aft port)  
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04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
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08/12/08 -- Progress M-65/30P launch  
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09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **50<sup>th</sup> Birthday of NASA**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
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04/??/09 -- **Six-person crew on ISS**  
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[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/26/07  
**Date:** Monday, November 26, 2007 11:32:12 AM  
**Attachments:**

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### **ISS On-Orbit Status 11/26/07**

All ISS systems continue to function nominally, except those noted previously or below. *Off-duty day for CDR Whitson, FE-1 Malenchenko and FE-2 Tani. Underway: Week 6 of Increment 16.*

Having passed the Day 30 mark in her flight, CDR-16 Whitson began her second session with the NASA/JSC experiment NUTRITION w/Repository, for which she had to forego exercising and food intake for eight hours. *[After collecting an initial urine sample, Whitson, assisted by Dan Tani, followed it with phlebotomy, i.e., drawing blood samples (from an arm vein) which she first allowed to coagulate in the Repository, then spun in the HRF RC (Human Research Facility/Refrigerated Centrifuge) and finally placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned (see RC troubleshooting, below). The equipment was then stowed. NUTRITION activities today included the required 24-hour data urine collection by Whitson, by securing samples during the day, all stored immediately in MELFI. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R +30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

FE-1 Malenchenko performed troubleshooting on the Russian RS1 laptop, spending about an hour with specialist tagup-supported tests of battery and HDD (Hard Disk Drive) performance as well as a checkout of display parameters using the temporarily connected external AGAT monitor.

For today's Voluntary Weekend Science program, FE-2 Tani had selected two optional activities: EPO (Education Payload Operations) demonstrating Newton's Laws (Three Laws of Motion & Conservation of Angular Momentum); and HRF RC (Human Research Facility Refrigerated Centrifuge) troubleshooting, i.e., determining why the RC is not cooling and or supplying H&S (Health & Status) data. *[For the first activity, Dan reviewed the EPO protocol, then set up the camcorder for video recording his subsequent demos which provide a simple visual explanation of Newton's Three Laws of Motion (EPO supports national science education standards, and the video will be used in museum and science center student and educator programs). For the second activity, Dan configured the RC, then conducted cooling and "ping" tests, after which the centrifuge was to be deconfigured, depending on the outcome of previous steps, and cleaned.]*

Later, Dan Tani set up and prepared the equipment for the second session with the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment, starting by supporting the ground-commanded activation of the MSG (Microgravity Science Glovebox), extending the WV (Work Volume) as required, starting and reprogramming the ECU (Electronic Control Unit), attaching the D/L Adapter and activating CSLM-2.

*[Afterwards, Tani disconnected the CSLM-2 D/L Adapter, retracted & secured MSG WV and powered down the MSG.]*

To allow troubleshooting of the UIA (Umbilical Interface Assembly)'s O<sub>2</sub> (oxygen) supply line in the U.S. Airlock (A/L), Peggy Whitson set up and mated the PHA (Prebreathe Hose Assembly) "Tee" connector to one of the PHA QDs (Quick Disconnects).

Later, the CDR terminated the discharge cycle on the first batch of EMU (Extravehicular Mobility Unit) batteries, and initiated it on the second batch, controlled by an automated SSC (Station Support Computer)-based DOS application. Peggy also finished up with the current regeneration of METOX (Metal Oxide) CO<sub>2</sub> filter canisters in the A/L bakeout oven.

Yuri Malenchenko completed the daily routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including ASU toilet facilities systems/replaceables. *[Regular daily SOZh maintenance consists, among else, of replacement of the KTO & KBO solid waste*

*containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Whitson transferred the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his voluntary "time permitting" task list, the FE-1 used the Nikon D1X digital camera with SIGMA 300-800mm telephoto lens to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

A second job item on Malenchenko's discretionary list for today was another session of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X with 400 & 800 mm focal length lenses to take pictures of the impact of global warming on the planet's ice cover. *[Photo targets were the Patagonia Southern Ice Field Glaciers, icebergs in the Drake Passage and Scotia Sea, and South Georgia Island Glaciers.]*

The CDR and FE-2 each had a PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop), Peggy at ~7:25am EST, Dan at ~10:15am.

No CEO (Crew Earth Observation) photo targets uplinked for today.

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

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Perigee height -- 338.9 km

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**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

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12/15/07 -- STS-122/Atlantis undocking  
12/17/07 -- STS-122/Atlantis landing ~12:29pm EST, **or**  
12/18/07 -- STS-122/Atlantis landing ~11:27am EST  
12/22/07 -- Yuri Malenchenko's Birthday  
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12/26/07 -- Progress M-62/27P docking (DC1)  
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04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
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04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
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04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/25/07  
**Date:** Sunday, November 25, 2007 2:26:06 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/25/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- light-duty day for CDR Whitson, FE-1 Malenchenko and FE-2 Tani. Ahead: Week 6 of Increment 16.*

The FE-1 started his day by recording post-EVA radiation readings from the Russian "Pille-MKS" dosimeters in the two spacesuits worn by Whitson & Tani during yesterday's spacewalk and from one background dosimeter. Measurements were logged in a table for subsequent downlink to the ground.

In the SM (Service Module), Malenchenko afterwards activated the Kenwood D700 amateur radio station and started the program for the Russian SHADOW-BEACON (Tenj-Mayak) experiment. *[Objective of the experiment is the automatic retranslation of time tag (pre-planned executable) packets from ground stations. SHADOW (or ECLIPSE), sponsored by Roskosmos and its leading Moscow research organization TSNIMASH (Central Research Institute of Machine Building), employs VHF amateur radio (ham) operators around the globe (via ARISS/Amateur Radio on ISS) to help in observing refraction/scattering effects in artificial plasmas using the method of RF (radio frequency) sounding in space experiments under different geophysical conditions. This is the experiment's second run, after Flight Engineer Mikhail Tyurin conducted it first on Expedition 14 in November 2006.]*

The FE-2 meanwhile performed the periodic offloading of the Lab CCAA (Common Cabin Air Assembly) dehumidifier's condensate tank, filling CWC (Contingency Water Container) #1062 with the collected water slated for processing, and putting aside two water samples in sample bags for analysis. *[Estimated offload time before termination (leaving ~6 kg in the tank): ~20 min. There is currently increased attention on water sampling after the discovery of some contaminated CWCs. The identified contaminant, a common soil bacterium (unicellular organism) called Wautersia after Belgian microbiologist Georges Wauters, is no more critical than what is found often in faucet water on the ground or in farm soil. Wautersia lives off*

*hydrogen & carbon dioxide, oxidizing H<sub>2</sub> and producing gaseous oxyhydrogen as energy for itself. Since it can turn sugar into a synthetic biodegradable fuel, it was seen for a short while as a promising long-term solution to the petroleum dependency, until it became clear that this “solution” would require gigantic amounts of expensive sugar.]*

Working in the Airlock, Dan Tani & Peggy Whitson later recharged the water tanks of their EMU (Extravehicular Mobility Unit) backpacks, using the fresh water from CWC #1062 and dumping the remaining water from the suits into CWC #1059, after UIA (Umbilical Interface Assembly) capping & plugging. The LTAs (Lower Torso Assemblies) and HUTs (Hard Upper Torsos) were then reassembled.

The CDR initiated the 8-10 hrs. discharge process on the EMU batteries in the BSA (Battery Stowage Assembly). *[This procedure, required prior to their use on the next spacewalk, consists of fully discharging and then recharging the storage units. The process, originally handled manually by a crewmember, is an automated procedure controlled from an A31p SSC (Station Support Computer) laptop with a special DOS application.]*

Whitson also initiated and monitored the regeneration of METOX (Metal Oxide) CO<sub>2</sub> filter canisters #0007 & #0011, used during the Campout.

At ~11:20am, spacewalk-specific activities concluded for today with a post-EVA debriefing conference between the crew and the ground via S-band audio.

Later, Peggy ingressed Node-2 after its isolation during the EVA, opening Harmony's aft hatch, installing the caps on the Node-2 Stbd & Port PPRVs (Positive Pressure Relief Valves) and manually opening the Node-2 aft port IMV (Intermodular Ventilation) valve. Next step in Harmony was for Peggy to check out the Node's C&W (Caution & Warning) panel, testing & verifying connectivities and reporting the “all clear” to MCC-H for further Node-2 activation steps from the ground.

Continuing the current round of monthly preventive maintenance of RS (Russian Segment) ventilation systems, Yuri Malenchenko cleaned the four “Group B” fan grills (VT1, VT2, VTK1, VTK2) in the SM.

Malenchenko also completed the daily routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Later, Yuri conducted the daily IMS (Inventory Management System) maintenance,

updating/editing its standard "delta file" including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur),- today as a voluntary task from his "time permitting" discretionary task list.

Working on the RBO MATRYOSHKA-R radiation monitoring payload in the DC1 (Docking Compartment), the FE-1 also completed the periodic collection and logging of accumulated data of its MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display. *[The reader automatically records radiation readings at strictly defined times (:00, :15, :30, :45 minutes). The complex Matryoshka payload suite is designed for sophisticated radiation studies. The payload collects radiation measurements every 15 minutes of each hour around the clock.]*

The CDR unstowed and set up the NUTRITION with Repository hardware for the blood draw and urine collection part of her second session with the NUTRITION experiment, beginning tomorrow, requiring Dr. Whitson to forego exercising & food intake for eight hours, i.e., starting tonight. Urine sample collection begins tomorrow morning and continues for 24h, i.e., through Tuesday morning. *[The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing in-flight samples (plus an additional postflight sample), made possible by the MELFI (Minus Eighty Degree Celsius Laboratory Freezer for ISS). Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status & nutrient requirements.]*

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Peggy transferred the exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~8:35am, the crewmembers held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

At ~9:40am, the FE-2 had another PFC (Private Family Conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

At ~2:25pm, Dan Tani conducted a crew discretionary conference via S- & Ku-band.

Later, at ~3:40pm, Yuri Malenchenko is scheduled to downlink a PAO TV message of greetings for replay on 12/7 at a special meeting by the Russian Federation State House commemorating the 50<sup>th</sup> anniversary of the formation of the Military & Industrial Commission, headed by Sergey Borisovich Ivanov, First Vice Prime Minister of the RF Government. [*...please accept our warm greetings on the 50<sup>th</sup> Anniversary of the Military & Industrial Commission! Over the past 50 years, the Military & Industrial Commission has made a major contribution to the defense & industrial potential of the USSR and subsequently of the Russian Federation...*]

No CEO (Crew Earth Observation) photo targets uplinked for today.

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12/17/07 -- STS-122/Atlantis landing ~12:29pm EST, **or**  
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02/07/08 -- Progress M-63/28P launch  
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02/14/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/01/08 -- Progress M-62/27P undocking (DC1) & reentry  
03/06/08 -- ATV-1 docking (SM aft port)  
04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **50<sup>th</sup> Birthday of NASA**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**

04/15/09 -- **Constellation's Ares I-X Launch.**

Note: The daily ISS On-Orbit Status reports can also be found at [http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/24/07  
**Date:** Saturday, November 24, 2007 1:31:32 PM  
**Attachments:**

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## ISS On-Orbit Status 11/24/07

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- Stage EVA day for CDR Whitson, FE-1 Malenchenko, FE-2 Tani, and Node-2 Harmony is ready to accept Columbus!*

**EVA-12 “Charlie” was completed successfully** in 7 hrs 4 min, accomplishing all objectives & get-ahead tasks.

As a consequence, **Node-2 Harmony was fully activated** by the ground, one day earlier than originally planned, enabling interior activations by the crew tomorrow.

During the spacewalk, CDR Peggy Whitson (EV1) and FE-2 Dan Tani (EV2), supported by FE-1 Yuri Malenchenko as intravehicular (IV) crewmember, connected and configured the second half of the Node-2 fluid, power, and cooling jumpers (the first half was accomplished on EVA-11 “Bravo” on 11/20).

*Specifically, the spacewalkers -*

- *Removed the portside S0 truss NH<sub>3</sub> (ammonia) shunt jumper;*
- *Configured vent tools, removed Node-2 fluid QD (quick disconnect) caps and vented & stowed the Port NH<sub>3</sub> shunt jumper;*
- *Relocated an APFR (Articulating Portable Foot Restraint) from Lab WIF-11 (Worksite Interface Fixture 11) to Lab WIF-12;*
- *Relocated the 300 lbs (136 kg), 18.5 ft (5.6 m) Node-2 Loop B fluid tray to the Lab, attached it and deployed its hinged section;*
- *Mated S0 fluid QDs, then opened S0 valves and 2 fluid QDs;*
- *Connected two Node-2 fluid line heater cables;*
- *Connected five Stbd avionics cables to Node-2;*
- *Released Node-2 Stbd CBM (Common Berthing Mechanism) petal launch locks (8 latches);*
- *Released Node-2 Port CBM petal launch locks (8 latches) [Nadir CBM launch locks remaining closed at this time to prevent the unlatched petals from opening (due to lost pin)];*
- *Mated backup SSPTS (Station-to-Shuttle Power Transfer System)*

- umbilical (connector J16A) to PMA-2 (ctr P16)*
- *Installed Lab/Node-2 gap spanner between two handrails (Lab & Node 2);*
  - *Removed Stbd SARJ (Solar Alpha Rotary Joint) Cover 7 and two MMOD shields for inspection & photography;*
  - *Re-installed the CETA (Crew & Equipment Translation Aid) Light Fixture that had been temporarily moved out of the way; and*
  - *Cleaned up a Lab MMOD (micrometeoroid/orbital debris) shield installed on an earlier EVA.]*

*[Official start time of the spacewalk was 4:50am EST, 70 minutes ahead of the timeline, ending at 11:54am. Total EVA duration (PET = Phase Elapsed Time) was 7h 4min. It was the 99<sup>th</sup> spacewalk for ISS assembly & maintenance and the 71<sup>st</sup> from the station (28 from Shuttle, 49 from Quest, 22 from Pirs) totaling 429h 7m, and the 3<sup>rd</sup> for Expedition 16 (totaling 21h 15m). After today's EVA, a total of 119 spacewalkers (88 NASA astronauts, 21 Russians, and ten astronauts representing Japan-1, Canada-4, France-1, Germany-1 and Sweden-3) have logged a total of 617h 29m outside the station on building, outfitting and servicing. It was also the 121<sup>st</sup> spacewalk by U.S. astronauts. The 100<sup>th</sup> EVA dedicated to ISS assembly & maintenance will be conducted in December by Rex Walheim & Hans Schlegel, crewmembers of the STS-122/1E mission that will feature two additional EVAs (by Walheim/Schlegel & Walheim/Love). ]*

As a late-added task, Tani and Whitson inspected and photographed Bay 7 of the anomalous starboard (right-side) SARJ (Solar Alpha Rotary Joint). They reported metallic, magnetic contamination on the main gear bearing's outboard angled race ring, similar to debris Dan saw in Bay 12 during his inspection on 10A EVA-2, as well as pitting and abrasions on the bearing race ring but not on the gear teeth themselves. *[With the Bay 7 cover remaining removed (returned onboard in a bag), the stage is set for the IMMT (ISS Mission Management Team) to consider close-up video inspections of the damage site with the SSRMS (Space Station Remote Manipulator System) cameras.]*

Prior to the spacewalk, FE-1 Malenchenko verified closure of the protective Lab window shutter.

Malenchenko also completed the pre-egress reconfiguration of the Russian STTS (onboard telephone/telegraph subsystem) to its EVA settings. After the crew's return, Yuri reconfigured the STTS for nominal ops. *[The "Voskhod-M" STTS enables telephone communications between the SM (Service Module), FGB, DC1 Docking Compartment and U.S. segment (USOS), and also with users on the ground over VHF channels selected by an operator at an SM comm panel, via STTS antennas on the SM's outside. There are six comm panels in the SM with pushbuttons for accessing any of three audio channels, plus an intercom channel.*

*Other modes of the STTS include telegraphy (teletype), EVA voice, emergency alarms, Packet/Email, and TORU docking support.]*

During the spacewalk, Yuri provided IV support and prepared the DCS 760 camera setup for post-ingress photographing of the EVA gloves. CDR Whitson later downlinked the EVA imagery to the ground and reconfigured the DCS 760 for regular use (e.g., removing its thermal blanket).

The FE-1 also performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module). *[Regular daily SOZh maintenance consists, among else, of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

After returning on board from outside, Whitson and Tani doffed the EMUs, after taking photographs of the gloves and overgloves while still pressurized. As part of post-EVA tasks, the spacewalkers also reported on size fit of their EMUs and components.

Later, Peggy and Dan are scheduled for another session of the standard Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis, after which Yuri restowed the Urolux equipment. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

Additionally, both spacewalkers also had their regular post-EVA PMCs (Private Medical Conferences) with the ground.

*RPCM Failure:* The RPC-2 (Remote Power Controller 2) switch in RPCM (RPC Module) SO-1A-D powering the Node-2 ammonia (NH<sub>3</sub>) umbilical survival heaters failed to close after two tries. If the cause is found to be a failed hybrid FET (Field Effect Transistor) as has been seen before, R&R (removal & replacement) of the RPCM is required. *[These heaters are needed only if the NH<sub>3</sub> loop is shut down.]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:16am EST [= epoch]):

Mean altitude -- 339.9 km  
Apogee height -- 340.7 km  
Perigee height -- 339.2 km  
Period -- 91.33 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0001107  
Solar Beta Angle -- 25.1 deg (magnitude increasing, to peak on 11/28 at 30.2 deg)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in the last 24 hours -- 133 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 51607

**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

11/28/07 -- ISS Reboost (SDMS taking data)  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite, ~4:31pm EST  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis undocking  
12/17/07 -- STS-122/Atlantis landing ~12:29pm EST, **or**  
12/18/07 -- STS-122/Atlantis landing ~11:27am EST  
12/22/07 -- Yuri Malenchenko's Birthday  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/23/07  
**Date:** Friday, November 23, 2007 12:52:23 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/23/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-1 Yuri Malenchenko performed Part 2 of the ground-controlled test of the Russian data telemetry system's MKO multiplex exchange channel, using BSR-TM payload data telemetry (TM) and the 4PrNP-6 data gathering application of the BITS2-12 Onboard Telemetry Measurement System. *[The test, controlled from the RSS2 laptop, began 11/21 with Yuri switching from the regular 128-byte TM frame to a 206-byte format, for TsUP to run tests from RGS (Russian Ground Sites). Today, in Part 2 as per plan the FE-1 returned the BSR-TM to the nominal 128-byte format.]*

Malenchenko also transferred measurements & imagery from the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) to OCA for subsequent downlink to the ground, after yesterday's first repositioning of the spectrometer. *[ALTCRISS uses the AST spectrometer to monitor space radiation in the Russian segment (RS).]*

FE-2 Dan Tani started his workday with another 60-min of personal time for general orientation (station familiarization & acclimatization), as is standard daily rule for the first two weeks after starting station residency.

The crewmembers performed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Later, the CDR transferred the crew's exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

After the physical workout, CDR Whitson took air samples for the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[Purpose of the 10-min. activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements.]*

Dan Tani filled out the regular FFQ (Food Frequency Questionnaire), his third, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. At TsUP/Moscow, food specialists are currently preparing the Russian food "menu" for delivery by Progress M-63/28P next February. 28P will carry "bonus food" for Peggy and Yuri, plus about 15 kg of fresh food items (apples, grapefruit, oranges, lemons, garlic) in two containers.]*

The FE-1 collected the periodic water samples downstream of the BKO multifiltration/purification column unit, to be returned to the ground on STS-122/1E for monitoring the quality of the water being fed to the Elektron O<sub>2</sub> generator by the BKO. *[The SRV-K2M Condensate Water Processor's BKO column removes dissolved mineral and organic impurities from the condensate.]*

Malenchenko also completed the daily routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including ASU toilet facilities systems/replaceables.

Later, Yuri conducted the daily IMS (Inventory Management System) maintenance, updating/editing its standard "delta file" including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur), - again a voluntary task from his "time permitting" discretionary task list.

Working off the voluntary U.S. "job jar" task list, the CDR performed computer maintenance, doing the regular bi-weekly reboots of the SSC (Station Support Computer) File Server and OCA Comm Router laptops.

Spending time in the Airlock (A/L) for final preparations for EVA "Charlie", Peggy

Whitson and Dan Tani –

- Configured the DCS-760 digital camera to be taken outside,
- Recharged one DCS battery for the EMU Prebreathe activity in the A/L (when off station power),
- Prepared the A/L EL (Airlock Equipment Lock) for the Campout & spacewalk,
- Tagged up with ground specialists at ~10:40am EST for reviewing EVA particulars, and
- Underwent the standard pre-EVA PMC (Private Medical Conference) via S- & Ku-band audio/video.

Also in the A/L, Peggy terminated the regeneration of METOX (Metal Oxide) canisters #0020 & #0021 in the bakeout oven. *[The reusable METOX CO<sub>2</sub> absorbers will not be used in the EMUs for EVA-12, but in the A/L during tonight's "Campout" lockout. During the spacewalk, CO<sub>2</sub> in the EMUs will be scrubbed with non-reusable LiOH (Lithium Hydroxide) canisters, with more "lifetime" than METOX cans, to protect against a possible timeline extension of EVA "Charlie" that - like EVA "Bravo" - is considered a "full" EVA. This means that all timeline content needs to be done in one EVA due to Node-2 Thermal Loop System shutdown timing. Also, working with ammonia (NH<sub>3</sub>) fluid couplings could require additional time for decontamination procedures.]*

Before the Campout, the CDR powered down onboard amateur (ham) radio equipment (Kenwood in SM, Ericsson in FGB) to prevent RF (radio frequency) interference with the EMUs.

Yuri again prepared three Russian "Pille-MKS" radiation dosimeters, recorded their dosages and equipped each of the two EMUs (Extravehicular Mobility Unit) with a radiation sensor (A0309/CDR & A0310/FE-2). *[A third sensor, A0308, was placed in the SM on the PULT reader for background readings.]*

At ~3:55am EST, Yuri linked up with TsUP stowage specialists via S-band to conduct the weekly IMS tagup, discussing stowage issues and equipment locations. *[Issues of discussion today included the search for a "lost" cable of the Russian Agat-2 Audio & Video Complex, needed for the future.]*

At ~1:45pm, the crew is scheduled for their third weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio *[S/G 2 (Space-to-Ground 2) phone patch via SSC-10 (Station Support Computer 10)].*

At ~2:50pm EST, Whitson & Tani will begin their Campout mask prebreathe, lasting

until ~4:00pm and followed by hatch closure by Yuri and overnight lockout in the A/L at 10.2 psi for denitrogenation.

Before his sleep time, Malenchenko will again isolate the Node-2 for the EVA (after its ground-commanded deactivation at ~12:00pm), by uncapping Harmony's Stbd & Port PPRVs (Positive Pressure Relief Valves), temporarily stowing the caps, closing the Node-2 Port IMV (Intermodular Ventilation) valve manually and closing Node-2 aft hatch.

*EVA-12 "Charlie" Preview:* After an 8.5-hr Campout sleep period on 10.2 psi, the A/L CL (Crewlock) hatch will be cracked for the usual hygiene break/with mask prebreathe. Afterwards, the hatch will be closed again by Yuri for EVA preparations at 10.2 psi, followed by EMU purge & prebreathe, then CL depressurization and EV1/EV2 egress. Tomorrow morning, EVA-12 begins nominally at ~5:55am EST, probably much earlier in real-time (knowing Peggy), with a 6h 30m timeline duration.

Dedicated to Part 2 of Node-2 outfitting (i.e., connecting & configuring the second half of Harmony's fluid, power and cooling jumpers), its objectives are for Peggy & Dan to:

- *Remove the S0 truss NH<sub>3</sub> (ammonia) shunt jumper on Port;*
- *Configure vent tools;*
- *Remove Node-2 fluid QD (quick disconnect) caps;*
- *Vent & stow the Port NH<sub>3</sub> shunt jumper;*
- *Relocate an APFR (Articulating Portable Foot Restraint) from Lab WIF-11 (Worksite Interface Fixture 11) to Lab WIF-12;*
- *Relocate Node-2 Loop B fluid tray to the Lab & attach it;*
- *Deploy Node-2 Loop B fluid tray hinged section;*
- *Mate S0 fluid QDs, then open S0 valves and 2 fluid QDs;*
- *Connect two Node-2 fluid line heater cables;*
- *Connect five Node-2 Stbd avionics cables to Node-2;*
- *Release Node-2 Stbd CBM (Common Berthing Mechanism) petal launch locks (8 latches);*
- *Mate remaining SSPTS umbilical (connector J16A) to PMA-2 (connector; P16)*
- *Install Lab/Node-2 gap spanner on two handrails (Lab & Node 2); and*
- *Remove Stbd SARJ (Solar Alpha Rotary Joint) Cover 7, using PGT (Pistol Grip Tool) on its 6 bolts.]*

Get-ahead tasks are:

- *Release Node-2 Port CBM petal launch locks (8 latches). [Nadir CBM launch locks remain closed at this time to prevent the unlatched petals from*

- opening (due to lost pin);*
- *Re-installation of CETA (Crew & Equipment Translation Aid) Light Fixture;*
  - *Clean-up of Lab MMOD (micrometeoroid/orbital debris) shield.*

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**ISS Orbit** (as of this morning, 8:02am EST [= epoch]):

Mean altitude -- 340.0 km

Apogee height -- 340.8 km

Perigee height -- 339.3 km

Period -- 91.34 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0001075

Solar Beta Angle -- 22.7 deg (magnitude increasing, to peak on 11/28 at 30.2 deg)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 139 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51591

**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

11/24/07 -- US EVA-12 "Charlie" (Whitson/Tani)

11/28/07 -- ISS Reboost

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite, ~4:41pm EST

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12/15/07 -- STS-122/Atlantis undocking

12/18/07 -- STS-122/Atlantis landing ~11:27am EST

12/22/07 -- Yuri Malenchenko's Birthday

12/23/07 -- Progress M-62/27P launch

12/26/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]

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04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch.**

Note: The daily ISS On-Orbit Status reports can also be found at  
[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/22/07  
**Date:** Thursday, November 22, 2007 1:48:50 PM  
**Attachments:**

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## ISS On-Orbit Status 11/22/07

All ISS systems continue to function nominally, except those noted previously or below. *Happy Thanksgiving -- on Earth & in Heaven (and in between)!*

CDR Whitson & FE-1 Malenchenko started off on today's light-duty schedule with another standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, Peggy's third, Yuri's fourth, using DCS-760 digital still cameras with 400 & 800mm lenses at Service Module (SM) windows 6 & 8 to take imagery of documented EO (Earth Observation) targets facing the velocity vector (i.e., in flight direction). Afterwards, Peggy downlinked the obtained images to the ground for analysis, to be discussed at a subsequent tagup. *[The skill training prepares crewmembers for the bottomsides mapping of the Orbiter at the arrival of STS-122/1E in December. During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Atlantis from SM windows 6 & 8, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

Afterwards, the FE-1 continued the current round of periodic preventive maintenance of cabin ventilation systems in the RS (Russian Segment), today cleaning "Group A" fan grilles in the SM.

The CDR conducted the weekly 10-min. CWC (Contingency Water Container) audit as part of the continuing WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. Analysis of samples of water transferred in CWCs from Discovery to ISS during 10A confirmed bacterial contamination in all containers transferred. Currently off-limit for crew use until further word are two CWCs with potable water and nine CWCs with technical water. Background: The identified contaminant, a common soil bacterium (unicellular organism) called *Wautersia* after Belgian microbiologist Georges Wauters, is no more critical than what is found often*

*in faucet water on the ground or in farm soil. Wautersia lives off hydrogen & carbon dioxide, oxidizing H<sub>2</sub> and producing oxyhydrogen as energy for itself. Since it can turn sugar into a synthetic biodegradable fuel, it was seen for a short while as a promising long-term solution to the petroleum dependency, until it became clear that it would require gigantic amounts of expensive sugar.]*

The FE-2 performed his fourth ICEPAC insertion in the MELFI (Minus Eighty-Degree Laboratory Freezer for ISS), retrieving two more -32 degC ICEPAC belts from stowage and placing them in Dewar 2/Tray B/Section 1 & Tray A/Section 4. *[The reason the crew is performing several ICEPAC insertions this week is because the amount of warm mass that can be placed in a dewar at one time is limited. These activities are in preparation for the next Cold Bag packing, planned for STS-122/1E.]*

In the SM, Malenchenko conducted his first periodic repositioning of the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) by changing the position of its AST spectrometer on panel 437 (90 deg rotation in its place to face in the Z- or upward direction) and swapping the AST's PCMCIA (Portable Computer Memory Card International Adapter) storage card #936 with #937. The activity was photo-recorded, with imagery downlinked afterwards. *[ALTCRISS uses the AST spectrometer to monitor space radiation in the Russian segment (RS).]*

Continuing their preparations for the next spacewalk, EVA-12 "Charlie" on 11/24 (Saturday), EV1 Peggy Whitson & EV2 Dan Tani worked in the U.S. Airlock (A/L) where they –

- Readied EVA tools (including checking a tether for EV2),
- Recharged the EMU backpacks with water (EMU #3006 got a full water tank dump & recharge; #3018 had only its water supply recharged),
- Reviewed uplinked updated procedural material for the spacewalk (some tasks, including get-aheads, were added since yesterday, *see below*),
- Terminated regeneration of METOX (Metal Oxide) canister #0015 & #0019 in the A/L bakeout oven and started the process on canisters #0020 & #0021 *[the A/L, currently Dan Tani's sleeping quarters, is staying within allowable ppCO<sub>2</sub> (Carbon Dioxide Partial Pressure) limits for Dan's sleeptime]*, and
- Terminated BSA (Battery Stowage Assembly) recharging of the EMU batteries used in EVA "Bravo".

*[Background: The regenerable METOX absorbers of CO<sub>2</sub> are currently not used in the EMUs but in the A/L during tomorrow night's "Campout" lockout of Peggy &*

*Dan. During their spacewalk, CO<sub>2</sub> scrubbing in the EMUs will be handled by LiOH (Lithium Hydroxide) canisters, with more "lifetime" than METOX cans, to protect against possible timeline extension of EVA "Charlie" that - like EVA "Bravo" - is considered a "full" EVA. This means that all timeline content needs to be done in one EVA due to Node-2 Thermal Loop System shutdown timing. Also, working with ammonia (NH<sub>3</sub>) fluid couplings could require additional time for decontamination procedures.]*

FE-1 Malenchenko completed the daily routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Yuri's daily maintenance of the IMS (Inventory Management System), updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur) today was a voluntary item on his "time permitting" discretionary task list.

The FE-1 used the SKDS CMS (Pressure Control & Atmosphere Monitoring System/Countermeasure System) to take the periodic readings of potentially harmful contaminants in the SM. The hardware was then returned to initial stowage. *[The CMS, part of the Russian GANK-4M atmospheric analysis suite, uses preprogrammed microchips to measure Formaldehyde (H<sub>2</sub>CO, methanal), Carbon Monoxide (CO) and Ammonia (NH<sub>3</sub>), taking one measurement per microchip.]*

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Dan transferred the crew's exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~3:35pm, the FE-2 is scheduled for another PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

Task items waiting for Whitson & Tani on their discretionary U.S. "job jar" list include

-

- (1) *Work on BCAT-3 (Binary Colloidal Alloy Test-3, specifically remove*

*samples from the CGBA-4 (Commercial Generic Bioprocessing Apparatus-4) & unstick the mixing magnet, with photography;*  
*(2) Relocating, in Node-2, the PS-120 (Power Strip) Junction Box from UOP-1 (Utility Outlet Panel 1) to the failed UOP-2; and*  
*(3) Starting U.S. trash gathering for disposal in Progress M-61/26P, aided by an uplinked preliminary (pre-E1) list of items.*

**EVA "Charlie" Preview [Update 11/22]:** EVA-12 on Saturday begins nominally at ~5:00AM EST, probably much earlier real-time (knowing Peggy), with a 6h 30m timeline. Dedicated to Part 2 of Node-2 outfitting (i.e., connecting & configuring the second half of Harmony's fluid, power and cooling jumpers), its objectives are for Peggy Whitson & Dan Tani to:

- *Remove the S0 truss NH<sub>3</sub> (ammonia) shunt jumper on Port;*
- *Configure vent tools;*
- *Remove Node-2 fluid QD (quick disconnect) caps;*
- *Vent & stow the Port NH<sub>3</sub> shunt jumper;*
- *Relocate an APFR (Articulating Portable Foot Restraint) from Lab WIF-11 (Worksite Interface Fixture 11) to Lab WIF-12;*
- *Relocate Node-2 Loop B fluid tray to the Lab & attach it;*
- *Deploy Node-2 Loop B fluid tray hinged section;*
- *Mate S0 fluid QDs, then open S0 valves and 2 fluid QDs;*
- *Connect two Node-2 fluid line heater cables;*
- *Connect five Node-2 Stbd avionics cables to Node-2;*
- *Release Node-2 Stbd CBM (Common Berthing Mechanism) petal launch locks (8 latches);*
- *Mate remaining SSPTS umbilical (connector J16A) to PMA-2 (connector; P16) **[New]***
- *Install Lab/Node-2 gap spanner on two handrails (Lab & Node 2); and (as get-ahead)*
- *Release Node-2 Port CBM petal launch locks (8 latches). [Nadir CBM launch locks remain closed at this time to prevent the unlatched petals from opening (due to lost pin);*
- *Remove Stbd SARJ (Solar Alpha Rotary Joint) Cover 7, using PGT (Pistol Grip Tool) on its 6 bolts.] **[New]***

Newly added Get-ahead tasks are:

- *Re-installation of CETA (Crew & Equipment Translation Aid) Light Fixture;*
- *Clean-up of Lab MMOD (micrometeoroid/orbital debris) shield.*

*Node-2 Checkout Status:* After crew ingress in Node-2 yesterday, ground controllers

successfully executed Part 1 of Node-2 Activation & Checkout. Powered on & verified were Node-2 connections to the MTL (Moderate Temperature Loop), ETCS (External Thermal Control System) Loop A, and EPS (Electrical Power System) Channel 1/4. It has been determined that Node-2 will remain activated during EVA-12, although its interior lighting and the functioning UOP (Utility Outlet Panel) will be turned off. *[Checkout of one string of the Node-2 EPS via activation of the DDCUs (DC-to-DC Converter Units) and RPCMs (Remote Power Control Modules) was successfully completed, as were the activations of the #1 MDM (Multiplexer/Demultiplexer) computer of Harmony and of the Node-2 MTL. CSA (Canadian Space Agency) Robotics successfully performed a brief SSRMS (Space Station Remote Manipulator System) base change to the Node-2 PDGF (Power and Data Grapple) to check out that connection, afterwards moving the robotarm back to the Lab PGDF to support EVA-12 viewing by its cameras. Node-2 Stbd & Port CBMs (Common Berthing Mechanisms) petals are properly latched so that the EVA-12 spacewalkers can remove their launch locks. The Nadir CBM, with petals unlatched because of the hatch pip pin lost in their mechanism, for the time being remains safed with launch locks engaged.]*

**CEO (Crew Earth Observation)** photo targets uplinked for today were **Mount Nyiragongo** (*this is one of Africa's most notable volcanic peaks and is located near the eastern border of the Democratic Republic of the Congo, just north of Lake Kivu, with much larger Lake Victoria well to the east. It is an active and dangerous volcano with steep slopes and extremely fluid lava flows. ISS pass was near nadir in mid-morning light. Frequent cloudiness makes this a challenging target, but the crew looked for landmarks and tried for long-lens, detailed views*), **Bosumtwi Impact Crater** (*this well-marked impact crater is located about 150 km west of the south end of Lake Volta in south central Ghana. It is a very young impact [just over a million years old], about 10.5 km in diameter, and almost completely filled by a lake. There are only a few images of this crater in the CEO database because the area is usually cloud and/or haze covered. On this early morning pass, as ISS approached the coast from the NW, the crew was to find Lake Volta and look just right of track*), **Kingman Reef, Central Pacific** (*Kingman Reef is a largely submerged, uninhabited tropical atoll located in the North Pacific Ocean, roughly half way between Hawaiian Islands and American Samoa. It is the northernmost of the Northern Line Islands and lies 65 km NNW of Palmyra Atoll, the next closest island. The total area within the rim of the reef, which has greater depths in the western part, is 60 km<sup>2</sup>. There is just one small strip of dry land on the eastern rim, with an area of less than 0.01 km<sup>2</sup>. The ISS pass was near nadir in early morning light, requiring long-lens settings for detail*), and **Palmyra Atoll, Central Pacific** (*Palmyra is one of the Northern Line Islands of the North Pacific Ocean and lies to the S-SE of Kingman Reef [previous CEO target]. This oddly shaped atoll has an area of 4.6 square miles [12 km<sup>2</sup>], and it consists of an extensive reef, two shallow lagoons, and some 50 sand and reef-rock islets and bars covered with vegetation with a small air strip on the north side. ISS pass was near nadir in early morning,*

*less than 10 seconds after Kingman).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 9:07am EST [= epoch]):

Mean altitude -- 340.2 km

Apogee height -- 341.2 km

Perigee height -- 339.2 km

Period -- 91.34 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.000151

Solar Beta Angle -- 19.9 deg (magnitude increasing, to peak on 11/28 at 30.2 deg)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 125 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51576

**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

11/24/07 -- US EVA-12 “Charlie” (Whitson/Tani)

11/28/07 -- ISS Reboost

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite, ~4:41pm EST

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis undocking

12/18/07 -- STS-122/Atlantis landing ~11:27am EST

12/22/07 -- Yuri Malenchenko’s Birthday

12/23/07 -- Progress M-62/27P launch

12/26/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]

02/06/08 -- Progress M-61/26P undocking (DC1) & reentry

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- ATV-1 “Jules Verne” launch/Ariane V (Kourou, French Guyana)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour undocking

02/29/08 -- STS-123/Endeavour landing  
03/01/08 -- Progress M-62/27P undocking (DC1) & reentry  
03/06/08 -- ATV-1 docking (SM aft port)  
04/07/08 -- Progress M-63/28P undocking (DC1) & reentry  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **50<sup>th</sup> Birthday of NASA**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/21/07  
**Date:** Wednesday, November 21, 2007 1:07:30 PM  
**Attachments:**

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## ISS On-Orbit Status 11/21/07

All ISS systems continue to function nominally, except those noted previously or below.

FE-1 Yuri Malenchenko started his workday with Part 1 of a software test of the Russian data telemetry system's MKO multiplex exchange channel, via BSR-TM payload data telemetry and the 4PrNP-6 data gathering application of the BITS2-12 Onboard Telemetry Measurement System. *[The test, using the RSS2 laptop, consisted of switching from the regular 128-byte TM frame to a 206-byte format, for the ground to run tests overnight from RGS (Russian Ground Sites). Tomorrow, in Part 2 the FE-1 will reconfigure the BSR-TM back to 128-byte format.]*

Afterwards, Malenchenko recorded the post-EVA radiation readings from the Russian EMU-worn plus one background "Pille-MKS" dosimeters in a log table for subsequent downlink to the ground.

Starting preparations of their next spacewalk, EVA-12 "Charlie" on 11/24 (Saturday), CDR Whitson and FE-2 Tani –

- Printed out the uplinked final version of EVA-12 procedures,
- Conducted a 2-hr. timeline & procedures review, joined by IV Malenchenko (see Preview, below), and
- At ~11:20am EST tagged up with ground specialists for a 45-min teleconference on spacewalk details via S- & Ku-band.

In the U.S. Airlock (A/L), Peggy and Dan then worked on their EMUs (Extravehicular Mobility Units), installing LiOH (Lithium Hydroxide) CO<sub>2</sub> absorption canisters, starting recharging the EMU batteries used in EVA "Bravo" and initiated the regeneration of METOX (Metal Oxide) canisters #0015 & #0019 in the A/L bakeout oven. *[The A/L, currently Dan Tani's sleeping quarters, is expected to stay within allowable ppCO<sub>2</sub> (Carbon Dioxide Partial Pressure) limits for Dan's sleeptime.]*

Peggy Whitson terminated Node-2 isolation maintained during the EVA by opening Harmony's aft hatch, installing the caps, which Yuri set aside on 11/19, on the Node-2 Stbd & Port PPRVs (Positive Pressure Relief Valves) and manually opened the Node-2 aft port IMV (Intermodular Ventilation) valve.

The FE-1 performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including ASU toilet facilities systems/replaceables.

Malenchenko also conducted the periodic (weekly) job of checkout/verification of IP-1 airflow sensors in the various RS (Russian Segment) hatchways, including the FGB-to-Soyuz tunnel and the FGB-to-Node-1 passageway.

Later, Yuri completed the daily maintenance of the IMS (Inventory Management System), updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The FE-2 performed his third ICEPAC insertion in the MELFI (Minus Eighty-Degree Laboratory Freezer for ISS), retrieving two more -32 degC ICEPAC belts from stowage and placing them in Dewar 2/Tray C/Sections 1 & 2. *[The reason the crew is performing several ICEPAC insertions this week is because the amount of warm mass that can be placed in a dewar at one time is limited. These activities are in preparation for the next Cold Bag packing, planned for STS-122/1E.]*

Tani also completed the periodic check of active U.S. payloads, i.e., cleaning the ANITA (Analyzing Interferometer for Ambient Air) inlet plus inspecting and filter cleaning of the CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to Earth.]*

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Dan transferred the crew's exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~7:20am EST, the crew convened for their weekly teleconference with ISS

Program Management at JSC/Houston via S-band/audio.

Later, at ~12:45pm, Dan Tani held a 30-min. crew conference via Ku- & S-band with the next FE-2, Garrett Reisman, who will be his successor after arriving on STS-123 in February next year. *[Performed every other week, these 30-min. crew conferences are being included in the current station crew's schedule to pass on the lessons learned to the upcoming Expedition Crew. The purpose is to begin the handover process prior to the arrival on orbit through Videocons and Data Exchanges between the current crew and the upcoming crew. These tagups usually start toward the end of the 1<sup>st</sup> month on orbit.]*

At ~3:15pm, the FE-2 is scheduled for his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

Working off his voluntary "time permitting" task list, Malenchenko took photographs of a QD (quick disconnect) screw clamp which has a spring missing. The snapshots were then transferred to OCA download files.

Task items waiting for Whitson & Tani on their discretionary U.S. "job jar" list include

-

- (1) Work on BCAT-3 (Binary Colloidal Alloy Test-3, specifically remove samples from the CGBA-4 (Commercial Generic Bioprocessing Apparatus-4) & unstick the mixing magnet, with photography;
- (2) Relocating, in Node-2, the PS-120 (Power Strip) Junction Box from UOP-1 (Utility Outlet Panel 1) to the failed UOP-2; and
- (3) Starting U.S. trash gathering for disposal in Progress M-61/26P, aided by an uplinked preliminary (pre-E1) list of items.

*Voluntary Weekend Science:* Three optional activities for the voluntary "Weekend Science" program were suggested to Peggy and Dan for their upcoming off-duty day on 11/26 (Monday). Their selection is required by tonight. *[The three choices are: (1) EPO (Education Payload Operations) demonstrating Newton's Laws (Three Laws of Motion & Conservation of Angular Momentum); (2) HRF RC (Human Research Facility Refrigerated Centrifuge) troubleshooting (determining why the RC is not supplying H&S (Health & Status) data); and (3) HRF-1 RIC (Rack interface Controller) software load (to enable powering up HRF Rack-1 PC (Portable Computer) via ground commanding and synchronizing the HRF Rack and PC time via ground commanding.]*

*EVA-12 "Charlie" Preview:* EVA-12 on Saturday begins nominally at ~5:00AM EST, with a 6h 25m timeline. Dedicated to Part 2 of Node-2 outfitting (i.e., connecting & configuring the second half of Harmony's fluid, power and cooling

jumpers), its objectives are for Whitson and Tani to:

- *Remove S0 truss NH<sub>3</sub> (ammonia) shunt jumper on Port;*
- *Configure vent tools;*
- *Remove Node-2 fluid QD (quick disconnect) caps;*
- *Vent & stow the Port NH<sub>3</sub> shunt jumper;*
- *Relocate an APFR (Articulating Portable Foot Restraint) from Lab WIF-11 (Worksite Interface Fixture 11) to Lab WIF-12;*
- *Relocate Node-2 Loop B fluid tray to Lab & attach it;*
- *Deploy Node-2 Loop B fluid tray hinged section;*
- *Mate S0 fluid QDs, then open S0 valves and 2 fluid QDs;*
- *Connect two Node-2 fluid line heater cables;*
- *Connect five Node-2 Stbd avionics cables to Node-2;*
- *Release Node-2 Stbd CBM (Common Berthing Mechanism) petal launch locks (8 latches);*
- *Install Lab/Node-2 gap spanner on two handrails (Lab & Node 2); and (as get-ahead)*
- *Release Node-2 Port CBM petal launch locks (8 latches). [Nadir CBM launch locks remain closed at this time to prevent the unlatched petals from opening.]*

*STS-122/Atlantis/E1 Mission/EVAs:* The STS-122/Atlantis (1E) mission, expected to launch on 12/6, is baselined for 11+1+2 days and 3 scheduled EVAs. Inspection of the flawed SARJ (Solar Alpha Rotary Joint) is not one of the scheduled objectives but would be a get-ahead task for the crew on the third EVA if there is time left for it. If the 1E mission can be extended by two added docked days (i.e., 13 +1+2), a fourth unscheduled EVA for dedicated SARJ work may be considered by the IMMT (ISS Mission Management Team).

**CEO (Crew Earth Observation)** photo targets uplinked for today were **S.**

**Mozambique** (*this target area is in the coastal plains of far southern Mozambique just north of the capital city of Maputo. Rapid development of this area is now being planned. To better monitor this change, CEO observers are seeking baseline, pre-development imagery. ISS approach was from the NW in mid-morning light. Fair weather was expected, and observers requested a nadir mapping strip of this area along the orbit track. There are very few strong landmarks or visual features to guide the photographer*), **Kerguelen** (*this glaciated and volcanic archipelago is located in the far south Indian Ocean nearly 2,000 miles SE of the island of Madagascar. Of primary interest is photography for monitoring of the rarely photographed ice field and glaciers located on the western end of the main island. ISS approach was from the W in mid-afternoon illumination. Using the long lens settings for a detailed, nadir mapping pass*), and **Patagonian Glaciers** (*the*

*Northern Patagonian Ice Field is the northernmost of two large remaining ice fields of South America, located in the Andes Mountains of southern Chile. It is also the world's largest ice field so far from the poles. Looking just right of track on this fair-weather pass near midday. The crew was asked to try for detailed views of the glacier features, particularly on the western and northern margins.)*

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<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

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12/18/07 -- STS-122/Atlantis landing ~11:27am EST

12/22/07 -- Yuri Malenchenko's Birthday

12/23/07 -- Progress M-62/27P launch

12/26/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]

02/06/08 -- Progress M-61/26P undocking (DC1) & reentry

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02/14/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
03/01/08 -- Progress M-62/27P undocking (DC1) & reentry  
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04/08/08 -- Soyuz TMA-12/16S launch  
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10/01/08 -- **50<sup>th</sup> Birthday of NASA**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
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04/??/09 -- **Six-person crew on ISS**  
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**HAPPY THANKSGIVING!**  
**Have a great & safe holiday!**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/20/07  
**Date:** Tuesday, November 20, 2007 2:06:45 PM  
**Attachments:**

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## ISS On-Orbit Status 11/20/07

All ISS systems continue to function nominally, except those noted previously or below. >>>Today 9 years ago, at Baikonur/Kazakhstan a Proton-K rocket (Flight 1A/R) launched the Khrunichev-built FGB (*Funktsionalnyi-Grusovoi Blok*) "Zarya" (Dawn), the first ISS element [see History Footnote, below.]<<<

Crew sleep cycle: 1:00am – 4:30pm EST.

**EVA-11 "Bravo" was completed fully successfully** in 7 hrs 16 min, accomplishing all objectives plus several get-ahead tasks. During the spacewalk, CDR Peggy Whitson (EV1) and FE-2 Dan Tani (EV2), supported by FE-1 Yuri Malenchenko as intravehicular (IV) crewmember, connected and configured one half of the Node-2 fluid, power, and cooling jumpers. The other half will be done on EVA-12 "Charlie" on 11/24 (Saturday).

*Specifically, the spacewalkers -*

- *Removed the Stbd NH<sub>3</sub> (ammonia) shunt jumper;*
- *Configured vent tools; then vented & stowed the NH<sub>3</sub> jumper;*
- *Released Node-2 fluid caps, reconfigured P1 radiator SFUs (Squib Firing Units, fired on 11/9), and released the Node-2 Loop A fluid tray;*
- *Relocated the Loop A fluid tray, then attached it, deployed/mated it, and vented N<sub>2</sub> (nitrogen) from it;*
- *Mated & opened hinge QDs (Quick Disconnects), S0 fluid QDs, and Node-2 fluid QDs;*
- *Connected 6 Node-2 fluid line heater cables;*
- *Connected 11 Node-2 Port avionics cables to Node-2; and*
- *Mated primary PMA-2/Node-2 umbilicals.*

*In addition, accomplishing three get-ahead tasks, Peggy & Dan -*

- *Connected 5 stbd avionics umbilicals to Node-2;*
- *Connected PMA-2 redundant umbilicals; and*
- *Deployed SSPTS (Station-to-Shuttle Power Transfer System) cabling.*

*[Official start time of the spacewalk was 5:10am EST, and it ended at 12:26pm. Total EVA duration (PET = Phase Elapsed Time) was 7h 16min. It was the 98<sup>th</sup> spacewalk for ISS assembly & maintenance and the 70<sup>th</sup> from the station (28 from Shuttle, 48 from Quest, 22 from Pirs) totaling 422h 3m. After today's EVA, a total of 117 spacewalkers (86 NASA astronauts, 21 Russians, and ten astronauts representing Japan-1, Canada-4, France-1, Germany-1 and Sweden-3) have logged a total of 609h 27m outside the station on building, outfitting and servicing. It also was the 120<sup>th</sup> spacewalk by U.S. astronauts.]*

For safety, the spacewalkers had been advised to wear APMAs (Adjustable Protective Mitten Assemblies), i.e., overgloves, at their discretion. *[Inspection of the EMU gloves was required frequently during the EVA..*

Prior to the spacewalk, FE-1 Malenchenko verified closure of the protective Lab window shutter. He also completed the pre-egress reconfiguration of the Russian onboard telephone/telegraph subsystem (STTS) to its EVA settings. After crew ingress, Yuri reconfigured the STTS for nominal ops. *[The "Voskhod-M" STTS enables telephone communications between the SM (Service Module), FGB, DC1 Docking Compartment and U.S. segment (USOS), and also with users on the ground over VHF channels selected by an operator at an SM comm panel, via STTS antennas on the SM's outside. There are six comm panels in the SM with pushbuttons for accessing any of three audio channels, plus an intercom channel. Other modes of the STTS include telegraphy (teletype), EVA voice, emergency alarms, Packet/Email, and TORU docking support.]*

During the spacewalk, Yuri prepared the DCS 760 camera setup for post-ingress photographing of the EVA gloves. CDR Whitson later downlinked the EVA imagery to the ground.

The FE-1 also performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

After returning on board from the EVA, Peggy and Dan Yuri were scheduled for another session of the standard Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. Both spacewalkers also had their regular post-EVA PMCs (Private Medical Conferences) with the ground. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro*

*diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

**STS-122/Atlantis/E1 Mission/EVAs:** The STS-122/Atlantis (1E) mission, expected to launch on 12/6, is baselined for 11+1+2 days and 3 scheduled EVAs. Inspection of the flawed SARJ (Solar Alpha Rotary Joint) is not one of the scheduled objectives but would be a get-ahead task for the crew on the third EVA if there is time left for it. If the 1E mission can be extended by two added docked days (i.e., 13 +1+2), a fourth unscheduled EVA for dedicated SARJ work may be considered by the IMMT (ISS Mission Management Team).

*History Footnote -- Zarya's 9<sup>th</sup> Anniversary:* When the FGB was launched on 11/20/1998, our Russian partners had special reasons to choose this name for the first ISS element, which means "Dawn" (and not "Sunrise" as often reported in the US): When Yuri Gagarin flew into space in Vostok-1 on April 12, 1961, his radio call name was "Kedr" (=Cedar), while the code word for the main ground station was "Zarya", and Chief Designer Sergei Pavlovich Korolev's call sign was "Zarya-1". Later, when the Soviet Union launched their first space station, using the "TKS" spacecraft, its Khrunichev builders wanted to name it "Zarya" in Gagarin's and Korolev's honor, but word from "higher-up" changed it to "Salyut" (=Greeting). That's why Zarya was chosen for the ISS/FGB, to signify the dawn of a new era of international cooperation in space, while the old "space traditionalists" had the last laugh.

**CEO (Crew Earth Observation) photo targets** uplinked for today were **Lake Chad** (*DYNAMIC EVENT: Lake Chad is a landmark feature of the Sahel region of north central Africa. Mostly dry now [sand dunes are exposed on the eastern side], the lake is a good indicator of climate and weather pattern shifts in the broad transition zone between savanna and desert. With the rainy season over, the crew was to try for contextual views of the lake level and vegetation patterns in the surrounding area. As ISS tracked SE-ward from the Sahara Desert in mid-morning, the target was well right of track*), **Bosumtwi Impact Crater** (*this well-marked impact crater is located about 150 km west of the south end of Lake Volta in south central Ghana. It is a very young impact [just over a million years old], about 10.5 km in diameter, and almost completely filled by a lake. There are only a few images of this crater in the CEO database because the area is usually cloud and/or haze covered. On this mid-morning pass, as ISS approached the coast from the NW, the crew was to find Lake Volta and look just right of track*), and **Jarvis Island, equatorial Pacific** (*Jarvis Island [formerly also known as Bunker Island] is an uninhabited 4.5 square kilometer coral island located in the South Pacific Ocean about one-half of the way from Hawaii to the Cook Islands. As the station approached from the NW in late morning sun, this trapezoid-shaped island was left of track.*)

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:28am EST [= epoch]):

Mean altitude -- 340.5 km  
Apogee height -- 341.8 km  
Perigee height -- 339.3 km  
Period -- 91.34 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.000184  
Solar Beta Angle -- 13.2 deg (magnitude increasing, to peak on 11/28)  
Orbits per 24-hr. day -- 15.76  
Mean altitude loss in the last 24 hours -- 93 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 51544

**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

11/24/07 -- US EVA-12 "Charlie" (Whitson/Tani)  
11/28/07 -- ISS Reboost  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite, ~4:41pm EST  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis undocking  
12/18/07 -- STS-122/Atlantis landing ~11:27am EST  
12/22/07 -- Yuri Malenchenko's Birthday  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. Satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]  
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02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
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03/01/08 -- Progress M-62/27P undocking (DC1) & reentry  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/19/07  
**Date:** Monday, November 19, 2007 2:05:09 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/19/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 5 of Increment 16.*

Before breakfast, CDR Peggy Whitson & FE-2 Dan Tani accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging, completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Peggy and Dan wear a special Actiwatch device which measures the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, currently as part of the crew's discretionary "job jar" task list.]*

Also before breakfast, in preparation for tomorrow's EVA-11 "Bravo", CDR Whitson, FE-1 Malenchenko and FE-2 Tani took the standard 15-min. pre-EVA session with the Russian crew health-monitoring program's medical assessment MO-9/ Biochemical Urinalysis. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

Yuri Malenchenko also completed the periodic (generally monthly) health test with the cardiological experiment PZEh MO-1 ("Study of the Bioelectric Activity of the Heart at Rest") on the TVIS (Treadmill with Vibration Isolation System). *[During the 30-min. test, the FE-1 tagged up with ground specialists on Russian ground site (RGS) passes via VHF (~12:23pm EST) and downlinked data from the Gamma-1M ECG (electrocardiograph) for about 5-6 minutes.]*

Later, Yuri collected 10 Russian “Pille-MKS” radiation dosimeters from their nominal exposure locations, recorded their dosages and equipped Peggy’s and Dan’s EMU (Extravehicular Mobility Unit) with one dosimeter each (A0309/CDR & A0310/FE-2). *[A third sensor, A0308, was placed in the SM (Service Module) on the PULT reader for background readings, and the others redeployed at their nominal locations in the SM and DC1.]*

Also in preparation for the spacewalk, Peggy Whitson & Dan Tani –

- Configured one DCS-760 still camera for the EVA with the 28mm lens, leaving it connected to station power until tomorrow’s EMU Prebreathe activity,
- Initiated charging of one DCS battery, to take over from station power tomorrow,
- Installed LiOH CO<sub>2</sub> (Lithium Hydroxide Carbon Dioxide) absorber canisters in their EMU/spacesuits,
- Powered down onboard amateur (ham) radio equipment (Kenwood in SM, Ericsson in FGB) to prevent RF (radio frequency) interference with the EMUs,
- Prepared the A/L EL (Airlock Equipment Lock) for the Campout & spacewalk,
- Tagged up with ground specialists at ~10:35am EST for reviewing EVA particulars, and
- Before Campout underwent the standard pre-EVA PMC (Private Medical Conference) via S- & Ku-band audio/video.

After completing the EVA teleconference with MCC-H, Peggy (EV1) and Dan (EV2), were ready to begin their “campout” in the A/L, starting mask prebreathe at ~2:00pm, then closing hatches and initiating depressurization of the CL (Crewlock) from 14.7 to 10.2 psi. Sleep time for the ISS crew begins at 4:30pm.

After the usual hygiene break/with mask prebreathe for Whitson and Tani at ~1:30am tomorrow morning after spending the night on 10.2 psi campout, the A/L hatch will be closed again by Malenchenko for EVA preps in 10.2 psi, followed by EMU purge & prebreathe. Afterwards, with CL depressurization and EV1/EV2 egress, EVA-11 “Bravo” nominally begins tomorrow at ~6:00am EST (*knowing Peggy, most likely earlier*). Yuri will support the spacewalk as IV (Intravehicular) crewmember.

*[EVA-11 is expected to last about 6h 40m. Its Node-2 Outfitting objectives are:*

- *Remove Stbd NH<sub>3</sub> (ammonia) Shunt Jumper;*
- *Configure Vent Tools;*
- *Vent & Stow the Stbd NH<sub>3</sub> Shunt Jumper;*
- *Release Node-2 Fluid Caps, reconfigure P1 radiator SFUs (Squib Firing*

- Units, fired today), and release Node-2 Loop A Fluid Tray;*
- *Relocate Node-2 Loop A Fluid Tray, then attach it, deploy/mate it, and vent N<sub>2</sub> (nitrogen) from it;*
  - *Mate & open hinge QDs (Quick Disconnects), S0 Fluid QDs, and Node-2 Fluid QDs;*
  - *Connect Node-2 Fluid Line Heater Cables;*
  - *Connect Node-2 Port Avionics to Node-2; and*
  - *Mate Primary PMA-2/Node-2 Umbilicals.*

*Potential get-ahead tasks, should there be time, are:*

- *Relocate N<sub>2</sub> VTE (Vent Tool Extender) bag for EVA-12 “Charlie”;*
- *Relocate APFR (Articulating Portable Foot Restraint) for EVA-12;*
- *Connect Stbd Avionics umbilicals to Node-2;*
- *Connect PMA-2 redundant umbilicals;*
- *Deploy SSPTS (Station-to-Shuttle Power Transfer System) cable; and*
- *Relocate APFR for 1E.*

Prior to Campout lockout, FE-2 Tani serviced the MELFI (Minus Eighty-Degree Laboratory Freezer for ISS) with another ICEPAC insertion, by retrieving two -32 degC ICEPAC belts from stowage and placing them in a MELFI dewar. *[The reason the crew is performing several ICEPAC insertions this week is because the amount of warm mass that can be placed in a dewar at one time is limited. These activities are in preparation for the next Cold Bag packing, planned for STS-122/1E.]*

Yuri performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

The FE-1 also completed the daily maintenance of the IMS (Inventory Management System), updating/editing its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Following his support of Campout start, FE-1 Malenchenko, after verifying with MCC-H that IMV (Intermodular Ventilation) with Node-2 has been deactivated, is to uncap the Node-2 starboard & port PPRVs (Positive Pressure Relief Valves), shut the Node-2 aft port IMV valve and close Harmony’s aft hatch.

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1,FE-2), RED resistive exerciser (CDR,

FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Dan Tani transferred the crew's exercise data file to the MEC laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~9:30am EST, the crew supported a PAO TV interview exchange with WBBM Radio (Steve Grzanich) in Chicago, IL.

At ~1:35pm, Malenchenko downlinked via VHF a message of greetings to congratulate Major General Sergey Alexandrovich Derepko on his appointment as Chief of the Military Financial & Economic Academy. [*...Thank you for your support of our launch. I hope that the fruitful cooperation between Russian pilot-cosmonauts and the Military Financial & Economic Academy will continue.*]

*Elektron Deactivation:* The station's Elektron O<sub>2</sub> (oxygen) generator in the SM has been turned off in support of the EVA. TsUP/Moscow's plan is to reactivate the electrolysis machine on 11/28. Meanwhile, the cabin atmosphere will be refreshed periodically with O<sub>2</sub> from Progress M-61/26P stores.

*Russian Solar Array Efficiency Test:* According to RSC-Energia, preliminary analysis of the results of the periodic SM Solar Array Efficiency Testing on 11/16 indicates essentially no decrease in photovoltaic performance.

No CEO (Crew Earth Observation) photo targets uplinked for today.

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Orbits per 24-hr. day -- 15.76

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Revolutions since FGB/Zarya launch (Nov. 98) -- 51528

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11/24/07 -- US EVA-12 "Charlie" (Whitson/Tani)

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12/08/07 -- STS-122/Atlantis/1E docking

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12/18/07 -- STS-122/Atlantis landing

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04/15/09 -- **Constellation's Ares I-X Launch.**

Note: The daily ISS On-Orbit Status reports can also be found at  
[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/18/07  
**Date:** Sunday, November 18, 2007 1:47:39 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/18/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for CDR Whitson, FE-1 Malenchenko and FE-2 Tani. Ahead: Week 5 of Increment 16.*

The crew completed the mandatory CHeCS (Crew Health Care Systems) emergency/contingency medical OBT (on-board training) drill, a one-hour U.S. exercise designed to refresh crewmembers' acuity in applying HMS (Health Maintenance System) equipment like ACLS (Advanced Cardio Life Support) in an emergency. *[The drill gives the crew the opportunity to work as a team in resolving a simulated medical emergency onboard ISS and to refresh their memory of on-orbit stowage & deployment locations, equipment use, and procedures. Setting up (but not actually operating/manipulating) onboard equipment such as the RSP (Respiratory Support Pack), ALSP (Advanced Life Support Pack), intubation kit, HMS defibrillator, all stowed in the Lab CHeCS rack, and the CMRS (Crew Medical Restraint System), Peggy, Yuri and Dan stepped through the ACLS algorithm manual to resolve a simulated medical emergency onboard ISS. Objectives of the exercise include practicing communication and coordination necessary to perform medical emergency procedures, locating appropriate emergency medical components, and determining each crewmember's individual method of delivering CPR (cardio-pulmonary resuscitation) in zero-G.]*

Malenchenko continued the current round of monthly preventive maintenance/cleaning of Russian segment SOTR ventilation systems, today working in the SM. *[The cleaning involved "Group C" fans and the heat exchanger (GZhT) grille of the currently inactive air conditioner (SKV1), plus the associated flexible air ducts.]*

Whitson printed out the latest uplinked procedures material on this week's Stage EVA-11 "Bravo" (11/20) and gathered the crew for another 2-hr review of EV1/EV2 timelines, procedures and constraints.

Afterwards, Peggy Whitson and Dan Tani had two more hours reserved for

preparing the EVA tools to be used by them on the spacewalk.

At ~10:10am EST, the crew also tagged up with ground specialists in a teleconference via S- and Ku-band, supported by the SSC-10 laptop, to go again through the EVA-11 procedures, particularly regarding ammonia decontamination. *[After the standard A/L Campout tomorrow night, EVA-11 is expected to last about 6h 40m. Its Node-2 Outfitting objectives are:*

- *Remove Stbd NH<sub>3</sub> (ammonia) Shunt Jumper;*
- *Configure Vent Tools;*
- *Vent & Stow the Stbd NH<sub>3</sub> Shunt Jumper;*
- *Release Node-2 Fluid Caps, reconfigure P1 radiator SFUs (Squib Firing Units, fired today), and release Node-2 Loop A Fluid Tray;*
- *Relocate Node-2 Loop A Fluid Tray, then attach it, deploy/mate it, and vent N<sub>2</sub> (nitrogen) from it;*
- *Mate & open hinge QDs (Quick Disconnects), S0 Fluid QDs, and Node-2 Fluid QDs;*
- *Connect Node-2 Fluid Line Heater Cables;*
- *Connect Node-2 Port Avionics to Node-2; and*
- *Mate Primary PMA-2/Node-2 Umbilicals.*

*Potential get-ahead tasks are:*

- *Relocate N<sub>2</sub> VTE (Vent Tool Extender) bag for EVA-12 “Charlie”;*
- *Relocate APFR (Articulating Portable Foot Restraint) for EVA-12;*
- *Connect Stbd Avionics umbilicals to Node-2;*
- *Connect PMA-2 redundant umbilicals;*
- *Deploy SSPTS (Station-to-Shuttle Power Transfer System) cable; and*
- *Relocate APFR for 1E.*

Also in preparation for the EVA, FE-2 Tani did some work on an EVA camera (#1019), removing the shutter release button of the camera's thermal blanket and concluding with the standard sharp-edge inspection of the modified blanket configuration.

In the “Quest” Airlock (A/L), Dan finished the regeneration cycle on the METOX (Metal Oxide) CO<sub>2</sub> absorption canisters #0017 & #0019 in the bakeout oven started yesterday by Peggy, and later also terminated the recharging of EMU (Extravehicular Mobility Unit) batteries in the A/L BSA (Battery Stowage Assembly).

Yuri Malenchenko meanwhile performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM). *[Regular daily SOZh maintenance consists, among else, of checking the ASU*

*toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers. Weekly SOZh reports (on Sundays) to TsUP/Moscow deal with number & dates of water and urine containers, counter readings of water consumption & urine collection, and total operating time of the POTOK air filtration system.]*

Afterwards, the FE-1 conducted the daily maintenance of the IMS (Inventory Management System), updating/editing its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The Russian Flight Engineer also set up the Russian equipment for tomorrow’s planned “Urolux” biochemical urine test (PZE MO-9), standard operating procedure for crewmembers before & after each EVA.

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Tani transferred the crew’s exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Dan had another 60 minutes for himself for general orientation (station familiarization & acclimatization), as is standard daily rule for the first two weeks after starting station residency.

At ~3:05pm EST, the FE-2 conducted his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:44am EST [= epoch]):

Mean altitude -- 340.7 km

Apogee height -- 341.9 km

Perigee height -- 339.5 km

Period -- 91.35 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0001791

Solar Beta Angle -- 5.5 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 112 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51512

**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

11/20/07 -- US EVA-11 "Bravo" (Whitson/Tani)

11/24/07 -- US EVA-12 "Charlie" (Whitson/Tani)

11/28/07 -- ISS Reboost

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis undocking

12/18/07 -- STS-122/Atlantis landing

12/22/07 -- Yuri Malenchenko's Birthday

12/23/07 -- Progress M-62/27P launch

12/26/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]

02/06/08 -- Progress M-61/26P undocking (DC1) & reentry

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour undocking

02/29/08 -- STS-123/Endeavour landing

03/01/08 -- Progress M-62/27P undocking (DC1) & reentry

03/06/08 -- ATV-1 docking (SM aft port)

04/07/08 -- Progress M-63/28P undocking (DC1) & reentry

04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)

04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)

04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.

04/26/08 -- STS-124/Discovery/1J docking

05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/01/08 -- **50<sup>th</sup> Birthday of NASA**  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/17/07  
**Date:** Saturday, November 17, 2007 2:26:18 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/17/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- off-duty day for CDR Whitson, FE-1 Malenchenko and FE-2 Tani except for housekeeping and voluntary work.*

After setting up the video camera gear for covering their CEVIS cycle ergometer workout, Peggy Whitson and Dan Tani activated the OUM-PFE (Oxygen Uptake Measurement - Periodic Fitness Evaluation) equipment at the HRF-2 (Human Research Facility 2) rack, including the HRF PFM/PAM (Pulmonary Function Module/Photoacoustic Analyzer Module), Mixing Bag System and GDS (Gas Delivery System). Both crewmembers then completed the evaluation protocol, wearing HRMs (Heart Rate Monitors), with each one in turn acting as subject and operator, obtaining measurements on themselves on the CEVIS cycle ergometer. *[The operations were documented with photo and video. Later, Peggy and Dan updated the evaluation protocol, deactivated & stowed the gear, including photo/video equipment, and powered down the OUM-PFE laptop. Purpose of OUM-PFE is to measure aerobic capacity during exercise within 14 days after arrival on ISS, and once monthly during routine PFEs. The data allows exercise physiologists & flight doctors to assess the crew's health & fitness and to provide data for modifying & updating crew-specific exercise regimes. PFE-OUM is a collaborative effort between NASA and ESA (European Space Agency).]*

In the Lab, the CDR performed the periodic inspection and cleaning of the FDS (Fire Detection & Suppression) system's bacteria filter und SD (smoke detector).

Yuri Malenchenko worked at the SM CP (Service Module Central Post), swapping the RS1 A31p laptop with the RS3 A31p. After making the connections, the FE-1 conducted a test of the replacement.

Malenchenko & Whitson undertook another 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, Peggy's second, Yuri's third, using DCS-760 digital still cameras with 400 & 800mm lenses at SM windows 6 & 8 to take imagery of

documented EO (Earth Observation) targets. Today's RPM training was scheduled to coincide with daylight ground tracks to support the EO shooting while practicing setting manual focus. Afterwards, Peggy downlinked the obtained images to the ground for analysis, to be discussed at a subsequent tagup. *[The skill training prepares crewmembers for the bottomside mapping of the Orbiter at the arrival of STS-122/1E in December. During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Atlantis from SM windows 6 & 8, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

Using the vacuum cleaner and other tools, FE-2 Tani performed the periodic 80-min US segment (USOS) hatch seal inspection (Node-1 forward, aft & starboard, Lab aft & forward, Node-2 aft & forward, and Joint Airlock) in support of ACS (Atmospheric Control System) maintenance (last time done: 9/25).

CDR Whitson had about an hour scheduled to update and deploy US SODF (Station Operation Data File) Warning books, required after the recent Node-2 relocation and prior to Harmony's activation. Updating consists of replacing page sections with new uplinked and printed-out material. *[The three Node-2 Relocate/Activation Warning books are deployed in the SM, FGB, and Lab.]*

In preparation for the upcoming Stage EVA-11 "Bravo" next week (11/20), the crew reviewed uplinked NH<sub>3</sub> (ammonia) decontamination OBT (Onboard Training) material, followed by tagging up with ground specialists via Ku- & S-band to discuss procedural particulars. *[EVA-11 will involve some handling of NH<sub>3</sub> coolant gear (venting & stowing).]*

Afterwards, Dan Tani started battery recharging for the EMU (Extravehicular Mobility Unit) spacesuits in the A/L BSA (Battery Stowage Assembly). *[Since BC (Battery Charger) 1 is hard failed, the procedure uses only BCs 2, 3 & 4.]*

Later, Peggy Whitson initiated METOX (Metal Oxide) CO<sub>2</sub> absorption canister regeneration, after installing used canister #0017 & #0019 in the A/L bakeout oven.

Yuri performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers.]*

The crewmembers completed their regular 2.5-hr. physical workout program (about

half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR/with OUM, FE-2/with OUM), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, the FE-2 transferred the crew's exercise data file to the MEC (Medical Equipment Computer) laptop for downlink, including the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Dan had another 60 minutes for himself for general orientation (station familiarization & acclimatization), as is standard daily rule for the first two weeks after starting station residency.

At ~7:05am EST, Yuri conducted his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

At ~8:50am, the crewmembers held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Working off the Russian voluntary task list, FE-1 Malenchenko used the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

As a second discretionary task list item, Yuri completed another radiation data monitoring & logging session for flow & dose power data with the Matryoshka-R radiation payload and its LULIN-5 electronics box (accumulated readings were recorded on a log sheet for subsequent downlink to TsUP/Moscow via the BSR-TM payload data channel).

*Task List Items:* Among the items waiting for Whitson & Tani on their discretionary "job jar" list are two audits – of onboard CTBs (Cargo Transfer Bags) and the "stowage rack of the week", currently the one at LAB1P5 -- using a new Audit function introduced with the implementation of the laptop-based IMS 2.0 version on Increment 15. *[This function allows the user to setup audits of bags, kits, stowage locations, just about anything that is considered a container, via a special Audit window with a linked Object Properties window.]*

**Weekly Science Update** (Expedition Sixteen -- 4<sup>th</sup>)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Radiation measurements continue to be performed throughout the Increment 16.

*ANITA:* Completed.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2:* Completed.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS):* Reserve

*CFE (Capillary Flow Experiment):* “CFE ended with a bang! And it has been a fun and productive ride. CFE's last (19th) experiment run in space, CFE-CL1, was conducted yesterday (11/16) by ISS CDR Peggy Whitson. The experiments were performed to round out CFE-CL experimental data that will serve as a benchmark for large scale capillary dynamics pertinent to fuels/cryogen/water management systems on spacecraft. Difficulties were encountered early when attempting to reset the experiment for subsequent runs, requiring Peggy to impart large disturbances to the test vessel to clear liquid from a pinning lip. It was not known by the science and engineering team how difficult this procedure would be for this container a priori. Despite the difficulties encountered, Peggy was successful in resetting the experiment at least three times after which successful data sets were collected each time. It cannot be overemphasized that all disturbances imparted to the container and/or MWA (Maintenance Work Area) by Peggy within the field of view of the camera produced new quantitative data extending our database and providing truly complex phenomena to test our numerical predictions. We wish to especially thank her and all of NASA in the air and ground for the fun and data. You will like our results when we publish!”

*CSI-2/CGBA (CGBA Science Insert #2/Commercial Generic Bioprocessing Apparatus):* In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* Complete.

*CSLM-2 (Coarsening in Solid-Liquid Mixtures 2):* Planned.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Complete.

*ETD (Eye Tracking Device):* In progress.

*Integrated Immune:* In progress.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* Since last report on 11/08, all the ECs (Experiment Containers) have been dried out in view of the experiment termination. MULTIGEN-1 Containers have been removed from EMCS (European Modular Cultivation System) on 11/15. Reference ECs have been inserted in the EMCS, and the final dry out is under way. The EMCS Facility was switched off on 11/15.

*MSG-SAME (Microgravity Science Glovebox):* Complete.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION/REPOSITORY:* In progress (CDR); Reserve (FE-2).

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* "Peggy, thanks for the quick turnaround in initializing another Actiwatch and completing your SLEEP logs off the task list. If the missing watch is found, the activity on the Task List will be to download three Actiwatches and initialize two. Additional SLEEP logging is above and beyond and greatly appreciated by the PI, however only the weeks with a targeted sleep differential will be on the Task List at this time. -- Dan, as you requested, we would like to remind you that your SLEEP logs have been added as a task list item. Only three weeks of SLEEP logging is required of continuous logging during varying weeks of sleep shifting to count as a SLEEP subject. Additional SLEEP logging is above and beyond and greatly appreciated by the PI, however only the weeks with a targeted sleep differential will be on the Task List at this time."

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* "Dan, the SPHERES team salutes you for your time and great effort this morning. The Group A Test 2 ran perfectly and a lot of the other data will allow for fine tuning satellite controllers. The 'attached satellite' tests use state-of-the-art algorithms, and they will require a substantial amount of data to succeed. We are look forward

to future operations that will focus on formation and docking tests. We expect that these will not only collect useful data, but also be visually amazing.”

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 11/13 the ground has received a total of 1,367 CEO images for review and cataloging for Increment 16. Observers are pleased to report a target acquisition success on their first day’s target list (11/8). The crew had some success in acquiring useful imagery of the Toshka Lakes, Egypt site. Most new crews take some time to settle in and usually take a couple of weeks before observers see any hits from their target requests. “Thanks for your prompt, enthusiastic startup of our payload! Nearly two-thirds of your imagery so far has been acquired with the long lens settings and most of it has good focus. It appears that we can begin sooner making target requests using these settings.”

**CEO (Crew Earth Observation)** photo targets uplinked for today were **Ouarkziz Impact Crater** (Ouarkziz is a relatively "young" impact crater, dated at 70 million years. The crater is 3.5 km in diameter and is located in the Atlas Mountains of western Algeria near the border with Morocco. As ISS crossed the Atlas Mountains from the NW in mid-morning sun, the crew was to shoot just left of track for the impact in folded rocks near the south side of the E-W mountain range), **Gulf of Fonseca** (observers are monitoring the rapid coastal development around this area shared by the three Central American countries of El Salvador, Honduras, and Nicaragua. ISS approach was from the NW along the Pacific side of Central America for a nadir pass with mid-morning lighting conditions. Looking for the landmark feature, the Consignina Volcano on the south side of the gulf, and mapping the coastal margins and the sediment plumes for this area), and **Pilcomayo River dynamics, Northern Argentina** (this dynamic river issues from the Andes Mountains to the W and then breaks SE-ward across the Chaco Plain forming part of the border between Argentina and Paraguay. Overlapping frames were requested to document the current channel and riverbank morphology for comparison to historical imagery. After crossing the Andes from the NW in midday sun, the crew was to look right of track for the bright sandbars of the river as it leaves the mountains. Mapping the area from NW to SE until the river dissipates a megafan on the Chaco Plain).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:41am EST [= epoch]):

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Eccentricity -- 0.0001703

Solar Beta Angle -- -1.4 deg (magnitude bottoming out)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 137 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51497

**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

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11/24/07 -- US EVA-12 "Charlie" (Whitson/Tani)

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12/18/07 -- STS-122/Atlantis landing

12/22/07 -- Yuri Malenchenko's Birthday

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02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour undocking

02/29/08 -- STS-123/Endeavour landing

03/01/08 -- Progress M-62/27P undocking (DC1) & reentry

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04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/16/07  
**Date:** Friday, November 16, 2007 1:49:43 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/16/07**

All ISS systems continue to function nominally, except those noted previously or below.

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, FE-1 Malenchenko performed preventive maintenance cleaning on the V3 fan screen in the DC1 (Docking Compartment) and on the VPkhO, VdPrK, VPrK and TsV2 fan grilles in the FGB (*Funktsionalnyi-Grusovoi Blok*).

In preparation for the first data collection session with the CEVIS-based OUM-PFE (Oxygen Uptake Measurement-Periodic Fitness Evaluation) by Whitson & Tani scheduled tomorrow, the CDR broke out and set up the OUM-PFE gear on the HRF-2 (Human Research Facility 2) rack, including the HRF PFM/PAM (Pulmonary Function Module/Photoacoustic Analyzer Module), Mixing Bag System and GDS (Gas Delivery System). *[The OUM-PFE experiment, which uses the CEVIS cycle ergometer, demonstrates crewmembers' capability to perform periodic fitness evaluations with continuous oxygen consumption measurements within 14 days after arrival on ISS, and once monthly during routine PFEs. Once the capability of the pulmonary function system (PFS) to perform PFEs is verified, crewmembers will be able to integrate their monthly PFE with oxygen consumption measurements to fulfill the requirement for cardiovascular fitness evaluations during long-duration space flight.]*

After a 15-min familiarization review of reference material, FE-2 Dan Tani had 2.5 hrs reserved for his first test session with the payload SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites). In support of this important experiment, the ground yesterday activated CDRA (Carbon Dioxide Removal Assembly). *[The SPHERES experiment is a test bed for the development and testing of formation flying and other multi-spacecraft control algorithms. SPHERES, done first by FE-1 Jeff Williams on Expedition 13, serves to mature autonomous satellite formation flight, rendezvous and docking algorithms in a long duration, microgravity environment. Dan set up the Work Area, dimmed GLAs (General Luminaire Assemblies), programmed & deployed two & three gas-propelled satellites (orange, red, blue), with five beacons, and used two PD-100 camcorders for video capture. Per applicable Flight Rule, SPHERES operations have no CO<sub>2</sub> (Carbon Dioxide) output constraints if the CDRA (CO<sub>2</sub> Removal Assembly) is operating in dual-bed or single-bed mode. Should CDRA not work properly, ECLSS (Environmental Control & Life Support System) engineers will assess the ppCO<sub>2</sub> flight rule requirement. The experiment run was time-critical since Ku-band is required for real-time video downlink.]*

Also in the “station onboard science research” regime, Dr. Whitson set up the CFE (Capillary Flow Experiments) payload, i.e., unstowing hardware, preparing the Lab MWA (Maintenance Work Area), securing CFE gear on the MWA surface and positioning the camcorder. Afterwards, Peggy conducted a ~2 hrs single-block test run of the CFE-CL1 (Contact Line 1) experiment and later tore down & restowed the hardware.

Peggy and Dan completed their first run with the MedOps WinSCAT (Spaceflight Cognitive Assessment Tool) experiment by logging in on the MEC (Medical Equipment Computer) and performing the psychological evaluation exercise on the laptop-based WinSCAT experiment. *[WinSCAT is a time-constrained questionnaire test of cognitive abilities, routinely performed by astronauts aboard the ISS every 30 days before or after the PHS (periodic health status) test or on special CDR's, crewmembers or flight surgeons request.]*

Yuri Malenchenko performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers. Weekly SOZh reports (on Sundays) to TsUP/Moscow deal with number & dates of water and urine containers, counter readings of water consumption & urine collection, and total operating time of the POTOK air filtration system.]*

The crewmembers completed their regular 2.5-hr. physical workout program (about

half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Dan Tani transferred the crew's exercise data file to the MEC for downlink.

At ~1:35pm EST, the crew held their regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio [S/G 2 (Space-to-Ground 2) phone patch via SSC-10 (Station Support Computer 10)].

At ~4:00pm, Yuri Malenchenko is scheduled for a PAO TV downlink to TsUP/Moscow as part of "Space Era Anniversary" features, today in support of the first talk show project "Great Ukrainians" on Channel INTER TV. *[Talk show guests include General Director of NKAU/Ukrainian National Space Agency Yuri Alekseev, the first Ukrainian Cosmonaut, Leonid Kadeniuk and the great-grandson of Konstantin E. Tsiolkovsky, Sergey Samburov. Yuri will be answering a number of questions ("Do you perceive yourself as a Ukrainian?"; "Which Ukrainian do you consider to be great?"). Note: Great Ukrainians in the field of spaceflight also include Sergey P. Korolev, M.K. Yangel, and others.]*

*Plaque Hanging:* At 12:50-1:15pm EST, the traditional official plaque hanging took place in ISS Mission Control/Houston for the Increment 15 Plaque.

*Russian Solar Array Efficiency Test:* At 6:40pm-10:00pm EST, during crew sleep, TsUP/Moscow is scheduled to conduct the periodic SM Solar Array Efficiency Testing. No ISS attitude change from the current +XVV (X-axis in Velocity Vector) will be necessary. *[If SNT (Voltage & Current Stabilizer) powerdown between USOS & RS is required, it will be a real-time call.]*

*Task List Items:* Among the items waiting for Whitson & Tani on their discretionary "job jar" list are two audits – of onboard CTBs (Cargo Transfer Bags) and the "stowage rack of the week", currently the one at LAB1P5 -- using a new Audit function introduced with the implementation of the laptop-based IMS 2.0 version on Increment 15. *[This function allows the user to setup audits of bags, kits, stowage locations, just about anything that is considered a container, via a special Audit window with a linked Object Properties window.]*

CEO (Crew Earth Observation) photo targets uplinked for today were **Afar Rift Zone, Ethiopia** *(this target is located at the northern end of the Great Rift Valley System of east Africa, just inland from the southern end of the Red Sea. In recent years, this region has become increasingly seismically active leading geologists to believe that major visible changes, with potential sea flooding, are possible in the*

future. Observers are monitoring this area for landscape changes in water bodies, fault lines, and volcanic activity. On this late morning pass the crew tried for a nadir mapping strip from NW to SE), **Tin Bider Impact Crater** (this 70-million year old impact site is located in central Algeria just south of the extensive sand sea known as the Grand Erg Oriental. On this pass in mid-morning sun the target was just left of track. Since the crater itself is just 6-km in diameter, requested were only context views this time. As ISS approached from the NW, the crew was to locate the southern end of the Erg and try for views of the plateau just to the south), **Mississippi Delta Region** (this classic, “bird’s foot”, river delta system is a prominent and dynamic feature of the northern Gulf of Mexico. A cold front has just passed, skies should have been clear, and tides were low on this mid-morning pass. As ISS tracked SE-ward across Louisiana, the crew was to locate the Mississippi River and then try mapping the delta area, especially the more dynamic southwestern flank), **Volcán de Colima** (the Colima volcanic complex is the most prominent volcanic center of the western Mexican Volcanic Belt. It consists of two distinctive volcanoes, Nevado de Colima [the 4320-m-high point of the complex] on the north and the 3850-m-high historically active Volcán de Colima at the south. Weather looked excellent and the view from the station was near nadir, so the crew tried for a long lens view of structural details of this feature. ISS approach was from the NW, over the Mexican coast in mid-morning), and **Honolulu, HI** (CREW REQUEST: This may have been one of the last opportunities for the crew to find the Hawaiian Islands in adequate light for the next several weeks. Oahu was well right of track to the SW. There probably was some fair weather cumulus at mid-morning. However, with the long lens settings the crew may still have obtained decent detail of Honolulu).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:36am EST [= epoch]):

Mean altitude -- 341.0 km

Apogee height -- 341.9 km

Perigee height -- 340.0 km

Period -- 91.35 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0001414

Solar Beta Angle -- -2.9 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 155 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 51481

**Significant Events Ahead** *(all dates Eastern Standard, some changes possible):*

11/20/07 -- US EVA-11 "Bravo" (Whitson/Tani)  
11/24/07 -- US EVA-12 "Charlie" (Whitson/Tani)  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis undocking  
12/18/07 -- STS-122/Atlantis landing  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)** [Check it out at <http://usspace50.com/>]  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)

10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

Note: The daily ISS On-Orbit Status reports can also be found at  
[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/15/07  
**Date:** Thursday, November 15, 2007 2:07:07 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/15/07**

All ISS systems continue to function nominally, except those noted previously or below.

After wakeup and before breakfast, CDR Peggy Whitson & FE-2 Dan Tani accessed the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging, completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Peggy and Dan wear a special Actiwatch device which measures the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition. The log entries are done within 15 minutes of final awakening for seven consecutive days, as part of the crew's discretionary "job jar" task list.]*

FE-1 Yuri Malenchenko serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The regen process will be terminated at ~3:55pm EST. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods. Filter bed 1 was regenerated yesterday.]*

Malenchenko & Whitson undertook the standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, Peggy's first, Yuri's second, using DCS-760 digital still cameras with 400 & 800mm lenses at Service Module (SM) windows 6 & 8 to take imagery of documented CEO Earth targets facing the velocity vector (i.e., in flight direction). Afterwards, Peggy downlinked the obtained images to the ground for analysis, to be discussed at a subsequent tagup. *[The skill training prepares crewmembers for the bottomside mapping of the Orbiter at the arrival of STS-122/1E in December. During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Atlantis from SM windows 6 & 8, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited,*

*requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

The FE-2 worked on the EMCS (European Modular Cultivation System) facility, removing MULTIGEN-1 (Molecular & Plant Physiological Analyses of the Microgravity Effects on Multigenerations of *Arabidopsis thaliana*) experiment containers from the rotors, as MULTIGEN-1 has reached the end of its 75-day run.

*[MULTIGEN was activated on 8/25. This ESA experiment evaluates the morphology of A. thaliana over three generations. The plants grown in EMCS are the First Generation of A. thaliana to be grown on ISS. A. thaliana, commonly known as Thale Cress, is a model organism to study genetic morphological events since its genome has been mapped and is widely used in genetic and molecular research. MULTIGEN studies the morphological and genetic effects of microgravity on plants, which will be grown to maturity (7-8 weeks) and then dried and stored for return to Earth. Some of the seeds that are returned will be used in ground studies and others will be returned to ISS for the Second Generation of growth. The Second Generation's seeds will be analyzed genetically and also used for a Third Generation of plants on ISS. Ultimately, the data collected from this multigenerational experiment could be applied to future agriculture endeavors for long-duration space flight.]*

The CDR and FE-2 spent ~40 min in the U.S. Airlock (A/L), successfully completing the standard water recharge of the EMUs (Extravehicular Mobility Units) used by her and Yuri during the recent EVA-10 "Alpha". *[The MIB (Mishap Investigation Board) that evaluated the results from the chamber EMU inspection -- after a "smell of smoke" was noticed in a SSATA (Space Station Airlock Test Article) chamber on 11/9 -- has cleared the on-orbit suits for the normal EMU water recharge (the original Flight Rule limit of 48 hrs for post-EVA recharge was extended to 7 days). The EMUs have the Go for spacewalk use.]*

Afterwards, the crew had two hours for reviewing the latest uplinked EVA procedures material and crib sheets, particularly on ammonia decontamination, of the upcoming spacewalk, EVA-11 "Bravo" on 11/20 (next Tuesday), followed by a teleconference with ground personnel to discuss details.

*[After the standard A/L Campout Monday night, EVA-11 is expected to last about 6h 40m. Its Node-2 Outfitting objectives are:*

- Remove Stbd NH<sub>3</sub> (ammonia) Shunt Jumper;*
- Configure Vent Tools;*
- Vent & Stow the Stbd NH<sub>3</sub> Shunt Jumper;*
- Release Node-2 Fluid Caps, reconfigure P1 radiator SFUs (Squib Firing Units, fired today), and release Node-2 Loop A Fluid Tray;*
- Relocate Node-2 Loop A Fluid Tray, then attach it, deploy/mate it, and vent*

*N<sub>2</sub> (nitrogen) from it;*

- *Mate & open hinge QDs (Quick Disconnects), S0 Fluid QDs, and Node-2 Fluid QDs;*
- *Connect Node-2 Fluid Line Heater Cables;*
- *Connect Node-2 Port Avionics to Node-2; and*
- *Mate Primary PMA-2/Node-2 Umbilicals.*

*Potential get-ahead tasks are:*

- *Relocate N<sub>2</sub> VTE (Vent Tool Extender) bag for EVA-12 “Charlie”;*
- *Relocate APFR (Articulating Portable Foot Restraint) for EVA-12;*
- *Connect Stbd Avionics umbilicals to Node-2;*
- *Connect PMA-2 redundant umbilicals;*
- *Deploy SSPTS (Station-to-Shuttle Power Transfer System) cable; and*
- *Relocate APFR for 1E.*

Continuing the interior outfitting of Node-2, Peggy Whitson completed a major task conducting activation & checkout of SPS ELPS (Secondary Power System/ Emergency Light Power Supply) systems in Harmony (22 bolts per panel!).

The CDR also performed the periodic thorough inspection of ELPS units in Node-1. *[There are three ELPS units in the Node.]*

The FE-2 meanwhile inspected and checked out the ELPS in the A/L, which has one unit.

In Node-2, Dan Tani removed the PPRV (Positive Pressure Relief Valve), now no longer required, and installed an MPEV (Manual Pressure Equalization Valve) in its place.

Whitson conducted the weekly 10-min. CWC (Contingency Water Container) audit as part of the continuing WDS (Water Delivery System) assessment of onboard water supplies. *[Updated “cue cards” based on the crew’s water calldowns are sent up every other week. Preliminary analysis of samples of water transferred in CWCs from Discovery to ISS during 10A indicates bacterial contamination in all containers transferred. This newly transferred water (no more critical than common faucet water on the ground) is not scheduled to be used in the near future, and there are ample other supplies on board. An investigation is underway to develop a forward plan.]*

FE-1 Malenchenko set up the pumping equipment and initiated (later closed out) the periodic transfer of urine from 4 EDV-U containers in the SM to the Rodnik BV2 tanks of Progress M-61 (26P). *[Leak checks performed by the crew on 10/8-9 on*

*the membrane (expulsion bladder) of the Progress' Rodnik BV1 tank showed that BV1 is unsuitable for liquid waste transfer due to a small leak in the tank's bladder.]*

Dan Tani took air samples for the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries are to be replaced if necessary. *[Purpose of the 10-min. activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements.]*

Peggy Whitson connected the regular ITCS LTL (Internal Thermal Control System/ Low Temperature Loop) coolant jumper to the LAB1D6 rack, to support the ground-commanded activation of the U.S. CDRA (Carbon Dioxide Removal Assembly), and Houston lowered the temperature setpoint to the regular 9.4 degC. *[CDRA activation is from 1:31pm-2:31pm.]*

Afterwards, the CDR activated the AR SDS (Atmosphere Revitalization/Sample Delivery System) in Node-2 by opening the SDS manual valves to allow for MCA (Major Constituents Analyzer) sampling of Node-2. *[The SDS, along with the MCA, PCA (Pressure Control Assembly), TCCS (Trace Contaminant Control Subassembly) and CVV (Carbon Dioxide Vent Valve assembly), is a subsystem of the Atmosphere Control & Supply System of the Lab's ECLSS (Environment Control & Life Support System).]*

Yuri completed the routine maintenance of the SOZh system (Russian ECLSS) in the SM, including ASU toilet facilities systems/replaceables; and

Dan filled out the regular FFQ (Food Frequency Questionnaire), his second, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

The FE-2 also conducted the periodic (every two weeks) inspection of the RED (Resistive Exercise Device) canister cords and accessory straps as well as the canister bolts for re-tightening if required.

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Tani transferred the crew's exercise data file to the MEC for downlink.

Dan had another 60 minutes for himself for general orientation (station familiarization & acclimatization), as is standard daily rule for the first two weeks after starting station residency.

At ~3:15am EST this morning, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~4:05am, Yuri linked up with TsUP stowage specialists via S-band to conduct the weekly IMS (Inventory Management System) tagup, discussing stowage issues and equipment locations. *[Issues of discussion today pertained to updating equipment locations assigned to Soyuz TMA-11, including packing of return equipment already stowed on ISS.]*

Two items waiting for Whitson and Tani on their discretionary "job jar" task list, besides the SLEEP logging (see above), are two audits – of onboard CTBs (Cargo Transfer Bags) and the "stowage rack of the week", currently the one at LAB1P5 -- using a new Audit function introduced with the implementation of the laptop-based IMS 2.0 version on Increment 15. *[This function allows the user to setup audits of bags, kits, stowage locations, just about anything that is considered a container, via a special Audit window with a linked Object Properties window.]*

*P1 Radiator Deployment:* This morning at ~6:00-7:00am EST, the ground successfully deployed the ETCS (External Thermal Control System) Loop B PVRs (Photovoltaic Radiators) #1 & #3 on the P1 truss, observed by video camera on the SSRMS robotarm, after it ungrappled Node-2 but remains based on the Lab PDGF (Power & Data Grapple Fixture). *[Russian thrusters were inhibited from 5:10-7:32am, and exercise prohibited during the deployment. Following the deployment, ETCS Loop A & B temperature setpoints were raised from 2.8 to 6.1 degC in preparation for commissioning of the six Node-2 IFHX's (Interface Heat Exchangers) during EVAs 11 (Bravo) and 12 (Charlie).]*

CEO (Crew Earth Observation) photo targets uplinked for today were **Ouarkziz Impact Crater** (*Ouarkziz is a relatively "young" impact crater, dated at 70 million years. The crater is 3.5 km in diameter and is located in the Atlas Mountains of western Algeria near the border with Morocco. As ISS crossed the Atlas Mountains from the NW in late morning, the crew was to shoot left of track for the impact in folded rocks near the south side of the E-W mountain range*), **S. Mozambique** (*this target area is in the coastal plains of far southern Mozambique just north of the capital city of Maputo. Rapid development of this area is now being planned. To*

*better monitor this change, CEO observers are seeking baseline, pre-development imagery. ISS approach was from the NW just after midday. Fair weather was expected and observers requested a nadir mapping strip of this area along the orbit track), and **Patagonian Glaciers** (the Northern Patagonian Ice Field is the northernmost of two large remaining ice fields of South America, located in the Andes Mountains of southern Chile. It is also the world's largest ice field so far from the poles. The crew had a near-nadir, fair-weather pass in mid-afternoon. They were to try for detailed views of the glacier features, particularly on the western and northern margins.)*

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11/24/07 -- US EVA-12 "Charlie" (Whitson/Tani)

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12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis undocking

12/18/07 -- STS-122/Atlantis landing

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**

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02/07/08 -- Progress M-63/28P launch  
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02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch.**

Note: The daily ISS On-Orbit Status reports can also be found at [http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/14/07  
**Date:** Wednesday, November 14, 2007 3:04:02 PM  
**Attachments:**

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## ISS On-Orbit Status 11/14/07

All ISS systems continue to function nominally, except those noted previously or below. *"...and I'm sooo happy it was all nominal!" (CDR Whitson, early this morning).*

Station sleep cycle: 1:00am – 4:30pm EST.

**Node-2 "Harmony"/PMA-2 (Pressurized Mating Adapter 2) relocation has been completed nominally**, and the crew has ingressed Node-2 way ahead of schedule.

With CDR Peggy Whitson operating CBMs (Common Berthing Mechanisms) and FE-2 Dan Tani controlling the SSRMS (Space Station Remote Manipulator System), the 17-ton Node-2/PMA-2 stack was unberthed at ~4:21am EST and transferred to the front of the station (first motion ~4:27am).. After reaching pre-mate position at the Lab Forward port at ~5:10am, full capture, with all 16 motorized bolts driven home OK, was achieved at ~5:45am -- about 2 hrs ahead of schedule.

Early after breakfast, before the transfer, Whitson terminated Node-1/Node-2 Vestibule depressurization, while Tani activated the CBCS (Centerline Berthing Camera System) and started the laptop-based DOUG (Dynamic Onboard Ubiquitous Graphics) software to support his SSRMS ops. For the relocation, Russian thrusters were temporarily inhibited.

With Node-2/Harmony firmly attached at the Destiny Lab, Peggy Whitson initiated pressurization of the Vestibule between the two modules and conducted the usual 1-hr checking for hermeticity (leak-tightness), using the ISA (Internal Sampling Adapter), VAJ (Vacuum Access Jumper), ISA scopemeter pressure probe, and a Multimeter.

Dan Tani meanwhile powered down the CBCS and removed the camera equipment and associated electronics & power cabling from its position at the Lab forward port.

FE-1 Yuri Malenchenko, after starting the new Russian MBI-12 SONOKARD (Sonocard) payload last night for his third experiment session, this morning terminated the run right after wakeup by taking the recording device from his SONOKARD sports shirt pocket. Later, Yuri copied the measurements to the RSE-MED laptop for subsequent downlink to the ground. *[SONOKARD objectives are stated to (1) study the feasibility of obtaining the maximum of data through computer processing of records obtained overnight, (2) systematically record the crewmember's physiological functions during sleep, (3) study the feasibility of obtaining real-time crew health data. Investigators believe that contactless acquisition of cardiorespiratory data over the night period could serve as a basis for developing efficient criteria for evaluating and predicting adaptive capability of human body in long-duration space flight.]*

Afterwards, Malenchenko serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #1 of the regenerable dual-channel filtration system. The regen process will be terminated before sleeptime, at ~4:15pm EDT. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

After leak check termination and vestibule hatch opening, Peggy and Dan had several hours set aside for Lab/Node-2 Vestibule Outfitting/Part 1, focusing on stringing & connecting avionics data & instrumentation jumpers, secondary power 1553 cables essential for Node-2 heater activation, and installing ACBM (Active CBM)-to-PCBM (Passive CBM) grounding straps.

Since Whitson and Tani were able to complete Part 1 of Vestibule Outfitting very much sooner than expected, including steps scheduled for tomorrow, the crew was given a Go to move forward with some of the Lab/Node-2 Vestibule Outfitting/Part 2 activities that were not scheduled to be completed until later this month (e.g., installation of remaining avionics & life support jumpers plus removal of the CBM CPAs).

Continuing to stay starkly ahead of schedule, Peggy and Dan then received the Go from the ground to open Node-2 hatch and ingress Harmony at ~11:35am (originally scheduled for 11/26).

FE-1 Malenchenko meanwhile was busy completing a number of servicing tasks such as –

- Continuing the current round of periodic preventive maintenance of ventilation systems in the RS (Russian Segment), first working in the DC1 (Docking Compartment) to replace the PF1,2 filter cartridges and clean the

V1 & V2 fan grilles and VD1 & VD2 air ducts, then moving to the Soyuz TMA-11/15S at the FGB nadir port to clean the screen of its BVN fan/heater assembly;

- Performing the periodic time synchronization between the RSS1 and the BSPN payload server, after testing functionality by checking data comm between the two computers and synching RSS1 to station time, in support of payload data transfers from the BSPN for subsequent downlink on OCA comm (via the Russian RSS1 laptop to a PCMCIA flash card). *[Before RSS1/BSPN synchronization, the RSS1 is updated with the exact time as per the station clock (which in turn is synchronized daily from RGS/Russian Ground Site). Experiment control application is a payload file transfer program called ShellForKE.];*
- Conducting the periodic checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1;
- Taking CWC (Contingency Water Container) #1069 to the RS for the periodic (about twice a month) replenishing of the Elektron oxygen generator's water supply for electrolysis, filling the KOV thermal loops' EDV container (also vom CWC #1029 if necessary). Once filled, the EDV was connected to the BPK transfer pump for processing. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.];*
- Completing the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables; and
- Performing the daily maintenance of the IMS (Inventory Management System), updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Yuri also had about an hour set aside for inspecting RS onboard computer & OpsLAN/Ethernet systems, including verifying laptop equipment, familiarizing himself with cabling functions and laptop assignments, checking anti-virus signature updates on the RSS2 laptop, and checking computer spares & accessories kits. The audit was supported by ground specialist tagup. *[In the RS, there are currently seven Russian computers in use: RSS1, RSS2, RSK1, RSE1, RSE-Med, TP2, and Laptop3.]*

The crewmembers completed a reduced physical workout program, limited today by structural constraints during the Node-2 transfer and outfitting.

At ~2:55pm EST, Malenchenko downlinked a TV PAO message of greetings to the participants of the 12<sup>th</sup> Kachin Readings Conference, sponsored by Y.A. Gagarin Cosmonaut Training Center (GCTC) in Star City on 11/24. *[This year's Kachin Readings, a "Scientific and Practical Conference" dedicated to the 97<sup>th</sup> anniversary of the creation of the Kachin Military Flight School, the first of its kind and recipient of the Lenin's Order and Red Banner, are being held in Star City, "not only because many cosmonauts started their careers as military pilots and Kachin School graduates, but also because aviation is a cradle of cosmonautics and has always been in the past and will continue to be in the future inextricably tied to space exploration." Kachin School history and the achievements of its alumni have become an integral part of the Russian national legacy. The school was founded by Grand Duke Alexander Michailovich following Nicholas II order using voluntary donations by the Russian public. On November 21, 1910, the School opened as the Sebastopol Officer School of Aviation and became a cradle for the air fleet, both military and civil.]*

*EVA Designations:* The original 10A EVA-5 has now become EVA-10 "Alpha", after it was delayed to 11/9, after 10A/Discovery's departure. Consequently, the next two Stage spacewalks by the ISS crew are now known as EVA-11 "Bravo" and EVA-12 "Charlie".

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:44am EST [= epoch]):

Mean altitude -- 341.3 km

Apogee height -- 342.6 km

Perigee height -- 340.0 km

Period -- 91.36 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0001918

Solar Beta Angle -- -11.8 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 122 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 51449

**Significant Events Ahead** (*all dates Eastern Standard, some changes possible*):

11/20/07 -- US EVA-11 "Bravo" (Whitson/Tani) -- **renamed**  
11/24/07 -- US EVA-12 "Charlie" (Whitson/Tani) -- **renamed**  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis undocking  
12/18/07 -- STS-122/Atlantis landing  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)

10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/13/07  
**Date:** Tuesday, November 13, 2007 12:44:05 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/13/07**

All ISS systems continue to function nominally, except those noted previously or below.

Station sleep cycle: 1:00am – 4:30pm EST.

FE-1 Yuri Malenchenko set up the equipment for the Russian MBI-18 DYKHANIE (“respiration”, “breathing”) experiment, then conducted the session, supported by ground specialist tagup, later closing down ops and stowing the equipment. *[Dykhania-1 gear uses two belts (PG-T/thoracic, PG-A/abdominal), a calibrator, resistor, mouthpiece, etc., to study fundamental physiological mechanisms of the external breathing function of crewmembers under long-duration orbital flight conditions. During the experiment, physiological measurements taken and recorded involve a pneumotachogram, thoracic pneumogram, abdominal pneumogram, and pressures in the oral cavity. All experimentally derived and salient environmental data along with personal data of the subject are recorded on PCMIA card for return to the ground at end of the Expedition. Objectives include determining the dynamics of the relationship between thoracic (pectoral) and abdominal breathing function reserves and their realization potential during spontaneous breathing, the coordinated spontaneous respiratory movements in terms of thoracic and abdominal components of volumetric, time & rate parameters of spontaneous respiratory cycle, identification of the features of humoral-reflex regulation of breathing by dynamics of ventilation sensitivity of thoracic and abdominal components to chemoreceptor stimuli, etc. Overall, the experiment is intended to provide a better understanding of the basic mechanisms of pulmonary respiration/ gas exchange gravitational relations of cosmonauts.]*

In preparation for tomorrow’s scheduled Node-2/PMA-2 relocation from the Node-1 portside dock to the Lab forward port, CDR Whitson and FE-2 Tank conducted the usual 1-hr review of the DOUG (Dynamic Onboard Ubiquitous Graphics) application for the required SSRMS (Space Station Remote Manipulator System) maneuvers.

Also for the relocation, later in the day (~8:40am EST) the MT (Mobile Transporter) was moved on its rail tracks from WS4 (Worksite 4) to WS7 by ground commanding. In support of this translation, the Russian thrusters were disabled from 7:35am to 10:40am. *[The translation was delayed by ~45 min due to a microswitch error message requiring troubleshooting and clearing up by ground controllers.]*

Later, Whitson and Tani worked on the Vestibule connecting Node-1 and Node-2, preparing it for Node-2 demating by installing the CPAs (Controller Panel Assemblies) on the ACBM (Active Common Berthing Mechanism), then conducting a final check of the vestibule, installing the CBM center disk cover and closing the Node-1 port hatch to the Vestibule.

Following hatch closure and the subsequent depressurization of the Vestibule to vacuum, started by the CDR after setting up the depress connections, the Node-2/PMA-2 "stack" is ready for the transfer tomorrow, scheduled around 5:25am, after a vestibule leak check and CBM demate. *[Correction: For yesterday's PMA-2 relocation, the SSRMS grappled the PMA on one of its two FRGFs (Flight Releasable Grapple Fixtures), not PDGFs (Power & Data Grapple Fixtures) as erroneously reported here; the PMAs have no PDGFs.]*

Malenchenko used the SKDS CMS (Pressure Control & Atmosphere Monitoring System/Countermeasure System) to take readings of potentially harmful contaminants in the SM (Service Module). The hardware was then returned to initial stowage. *[The CMS, part of the GANK-4M analyses (see below), uses preprogrammed microchips to measure Formaldehyde (H<sub>2</sub>CO, methanal), Carbon Monoxide (CO) and Ammonia (NH<sub>3</sub>), taking one measurement per microchip. CMS is part of the GANK-4M analysis conducted today.]*

Later, Yuri also collected the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Dan Tani retrieved and stowed the two FMKs (Formaldehyde Monitoring Kits) deployed by him on 11/11 in the Lab (below CEVIS cycle) and SM (most forward handrail).

Dan had another 60 minutes for himself for general orientation (station familiarization & acclimatization), as is standard daily rule for the first two weeks

after starting station residency.

The FE-1 continued the current round of monthly preventive maintenance of RS (Russian Segment) ventilation systems, today working in the FGB (*Funktsionalnyi-Grusovoi Blok*) to access and clean the protective mesh screens of its TsV1 central ventilation fan assembly.

Also in the Khrunichev-built module, Malenchenko, supported by ground specialist tagup, conducted troubleshooting on temperature sensors of the FGB's retracted SB4 starboard solar array wing.

The FE-1 performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Additionally, Yuri conducted the daily maintenance of the IMS (Inventory Management System), updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers completed their physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (FE-2), and VELO bike with bungee cord load trainer (FE-1).

The FE-2 then transferred the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*Weekend Voluntary Science:* Four optional activities for the voluntary "Saturday Science" program for next weekend (11/16-18) were suggested to Peggy and Dan for their choice. Selection is required by tonight. *[The four choices are: (1) BCAT-3 (Binary Colloidal Alloy Test-3) Magnet Unstick, using the CGBA-4 (Commercial Generic Bioprocessing Apparatus-4), powered up 12 hrs before to initiate cooling; (2) CFE-CL (Capillary Flow Experiment – Contact Line): voice & video of a 4-hr run of his last session to complete the CFE investigations; (3) SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites), flying two & three satellites, requiring 2 video camcorders & 2 VTRs; and (4) EPO (Education Payload Operations) demonstrating Newton's Laws (Three Laws of Motion & Conservation of Angular Momentum).]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

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Eccentricity -- 0.0001818  
Solar Beta Angle -- -16.4 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.76  
Mean altitude loss in the last 24 hours -- 106 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 51434

**Significant Events Ahead** (*all dates Eastern Standard, some changes possible*):

11/14/07 -- Node-2 (Harmony) plus PMA-2 relocation to front of Lab  
11/20/07 -- US EVA-10 (Peggy Whitson/Dan Tani)  
11/24/07 -- US EVA-11 (Peggy Whitson/Dan Tani)  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis undocking  
12/18/07 -- STS-122/Atlantis landing  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
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01/31/08 -- ATV-1 “Jules Verne” launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
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02/14/08 -- ATV-1 docking (SM aft port)  
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02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking

02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
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05/02/08 -- STS-124/Discovery/1J undocking  
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08/14/08 -- Progress M-65/30P docking (SM aft port)  
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09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch.**

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[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/12/07  
**Date:** Monday, November 12, 2007 4:49:49 PM  
**Attachments:**

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## ISS On-Orbit Status 11/12/07

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 4 of Increment 16.*

Station sleep cycle: 1:00am – 4:30pm EST.

**PMA-2 (Pressurized Mating Adapter 2) relocation was successfully completed.** Using the SSRMS (Space Station Remote Manipulator System), CDR Whitson and FE-2 Tani unberthed the PMA-2, transferred it, and reberthed it at the Node-2 Forward dock. *[Prior to the transfer ops, the Node-2 Fwd CBM (Common Berthing Mechanism) unexpectedly deactivated due to a comm dropout. Ground controllers executed troubleshooting steps to restore the CBM to function for the transfer, and the ops proceeded nominally.]*

Early after breakfast, before the transfer, Whitson removed and temporarily stowed CTBs (Cargo Transfer Bags) from Node-1 stowage location to gain access to the Node-1 P1 panel until the . THC (Temperature & Humidity Control) vent configuration in Node-1 was completed later in the day and the panel was back in place. Dan Tani then restowed the CTBs in Node-1 at panel P1.

Afterwards, Dan Tani activated the CBCS (Centerline Berthing Camera System) at the Node-2 Fwd hatch, to help in PMA pre-mate aligning for reberthing.

In the FGB, FE-1 Malenchenko meanwhile disconnected and stowed power cables for the FGB SAWs (Solar Array Wings) deploy/retract drive.

While Dan started up the DOUG (Dynamic Orbital Ubiquitous Graphics) software for monitoring SSRMS maneuvering, Peggy conducted another leak check, verifying that PMA-2 internal pressure had decreased to less than 1.4 mmHg. After notifying MCC-Houston, the Go was given for unberthing.

With the PMA PDGF (Power & Data Grapple Fixture) firmly gripped by the

Canadian robotarm, the Node-1 Fwd CBM was unbolted from the ground, and the PMA slowly moved over to the ISS port side by Whitson and Tani, to be successfully docked, mated and bolted at the Node-2 Fwd CBM.

During the transfer, Yuri Malenchenko was busy auditing and restocking the Russian SSV (Docking & Internal Transfer System) accessory kits. *[Support equipment in the SSV kits includes handles, caps, screwdrivers, extenders, quick-disconnect clamps, wrenches, etc.]*

After the transfer, FE-2 Tani performed safing procedures for the SSRMS.

Malenchenko worked on the SRV-K2M Condensate Water Recovery System, removing and replacing the lifetime-expired BRPK-2 Air/Liquid Condensate Separator unit with a new spare, stowing the old part for disposal.

Yuri also continued the extended leak checking of the spare BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator by charging the unit once again with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (# by21). The last test pressurization was on 7/19 by Kotov. *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

CDR Whitson started preparations for the relocation of the Node-2/PMA-2 “stack” on 11/14 by deactivating the interim ventilation configuration in “Harmony”, disassembling the air duct and installing an IMV (Intermodular Ventilation) valve at Node-2 aft starboard.

After Dan Tani removed the deactivated CBCS and relatched the Node-2 Fwd hatch, the crew egressed from “Harmony” and isolated the Italian-built module by closing the inner hatches (after ingressing a second time to remove covers). The CBCS was then set up at the Node-1 Fwd hatch to support the upcoming “stack” transfer.

Using the vacuum cleaner and other tools, the FE-2 performed a 15-min hatch seal inspection on the Node-1 port hatch where “Harmony” is currently berthed.

Tani also completed the periodic check of active U.S. payloads, i.e., cleaning the ANITA (Analyzing Interferometer for Ambient Air) inlet plus inspecting and filter cleaning of the CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to Earth.]*

Afterwards, Dan did the periodic checkout of the prime CSA-CP (Compound

Specific Analyzer-Combustion Products), #1051, changing out its sensor battery.

Using the Russian AK-1M adsorber and IPD Draeger tubes, Yuri conducted the periodic sampling of cabin air for subsequent analysis on the ground. *[FE-1 started out by taking air samples in the SM (Service Module) and FGB and to check for leaked-out Freon in the SM, then switched to the IPD-CO Draeger tubes sampler to check for CO (carbon monoxide) in the SM.]*

Later, Dan Tani also collected air samples with a U.S. GSC (Grab Sample Container) at the center of the Lab and SM.

Malenchenko completed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The FE-1 did the daily maintenance of the IMS (Inventory Management System), updating/editing its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

FE-2 Tani had another 60 minutes for general crew orientation (station familiarization & acclimatization), as is standard daily rule for the first two weeks after starting station residency.

The crewmembers completed their physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (FE-1/fulltime), and RED resistive exercise device (CDR).

Dan then transferred the crew’s exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*EMU Spacesuit Troubleshooting:* During a SSATA (Space Station Airlock Test Article) chamber run on the ground this past Friday, a crew member reported the smell of smoke inside the EMU (Extravehicular Mobility Unit). The run was terminated, and the crew member extracted without incident. A mishap investigation board was formed and has recommended that all life support system operations (power, O<sub>2</sub> ops, etc.) for the on-orbit EMUs be terminated until a root cause can be determined. Thus, the on-orbit EMUs are No Go. All other ops, such as suit resizing, can be performed.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** *(all dates Eastern Standard, some changes possible):*

11/14/07 -- Node-2 (Harmony) plus PMA-2 relocation to front of Lab

11/20/07 -- US EVA-10 (Peggy Whitson/Dan Tani)

11/24/07 -- US EVA-11 (Peggy Whitson/Dan Tani)

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis undocking

12/18/07 -- STS-122/Atlantis landing

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 “Jules Verne” launch/Ariane V (Kourou, French Guyana)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**

02/06/08 -- Progress M-62/27P undocking

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- ATV-1 docking (SM aft port)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour undocking

02/29/08 -- STS-123/Endeavour landing

04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)

04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)

04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.

04/26/08 -- STS-124/Discovery/1J docking

05/02/08 -- STS-124/Discovery/1J undocking

05/14/08 -- Progress M-64/29P launch

05/16/08 -- Progress M-64/29P docking (DC1)

07/29/08 -- ATV-1 undocking (from SM aft port)

08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

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[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/11/07  
**Date:** Sunday, November 11, 2007 2:02:03 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/11/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – Crew off duty. Ahead: Week 4 of Increment 16.*

Station sleep cycle: 1:00am – 4:30pm EST.

The crew conducted the regular weekly three-hour task of thorough station cleaning. [*"Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.*]

As part of the house cleaning, FE-1 Yuri Malenchenko performed preventive maintenance cleaning on the V3 fan screen in the DC1 (Docking Compartment) and on the VPkhO, VdPrK, VPrK and TsV2 fan grilles in the FGB.

Later, the FE-1 completed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables plus the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Malenchenko also gathered weekly data on total operating time & "On" durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

In preparation of tomorrow's planned transfer of the PMA-2 (Pressurized Mating Adapter 2) from the Lab forward port to the Node-2 portside CBM (Common Berthing Mechanism), CDR Whitson depressurized PMA-2, evacuating any atmospheric residuals to vacuum and afterwards monitoring the internal state.

Also for the PMA-2 move, FE-2 Dan Tani unlatched the Node-2 forward hatch to its hardstop to test the mechanism (hatch remaining safely closed due to pressure differential) and then installed the CBCS (Centerline Berthing Camera System), with its cabling through the Node-1/Node-2 hatchway, at the Node-2 port where PMA-2 will be berthed.

The crew conducted the standard pre-Robotics review of SSRMS (Space Station Remote Manipulator System) procedure using the DOUG (Dynamic Orbital Ubiquitous Graphics) software application.

Tani performed the periodic deployment of two passive FMK (formaldehyde monitoring kit) sampling assemblies in the Lab (below CEVIS) and SM (most forward handrail) for two days, to catch any atmospheric formaldehyde on a collector substrate for subsequent analysis on the ground.

The FE-2 and CDR had their weekly PFCs (Private Family Conferences) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop), Dan at ~9:30am EST, Peggy at ~10:45am.

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

No CEO (Crew Earth Observation) photo targets uplinked for today.

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**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

11/12/07 -- PMA-2 relocation to Node 2, ~5:40am

11/14/07 -- Node-2 (Harmony) plus PMA-2 relocation to front of Lab

11/20/07 -- US EVA-10 (Peggy Whitson/Dan Tani)

11/24/07 -- US EVA-11 (Peggy Whitson/Dan Tani)

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis undocking

12/18/07 -- STS-122/Atlantis landing  
 12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
 12/23/07 -- Progress M-62/27P launch  
 12/25/07 -- Progress M-62/27P docking (DC1)  
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 01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
 02/06/08 -- Progress M-62/27P undocking  
 02/07/08 -- Progress M-63/28P launch  
 02/09/08 -- Progress M-63/28P docking  
 02/14/08 -- ATV-1 docking (SM aft port)  
 02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
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 05/14/08 -- Progress M-64/29P launch  
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 09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
 10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
 10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
 10/14/08 -- Soyuz TMA-13/17S launch  
 10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
 04/??/09 -- **Six-person crew on ISS**  
 04/15/09 -- **Constellation's Ares I-X Launch.**

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/10/07  
**Date:** Saturday, November 10, 2007 12:07:39 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/10/07**

All ISS systems continue to function nominally, except those noted previously or below. *Crew off duty.*

Station sleep cycle remains at the regular 1:00am – 4:30pm EST.

For today's workouts by all crewmembers on the RED (Resistive Exercise Device), CDR Whitson set up the video camcorder for filming the sessions. Afterwards, the video equipment was put back in stowage. *[The RED video, showing the apparatus on the "ceiling" hatch of the Node, is periodically required to support biomechanical evaluation of the exercising crewmember and assessment of the on-orbit setup of equipment during data collection.]*

Following up on yesterday's successful EVA-5, FE-1 Malenchenko recorded the post-EVA radiation readings from the EMU/suit-worn and background "Pille-MKS" dosimeters and returned the sensors to their regular sites.

FE-2 Tani took air samples for the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries are to be replaced if necessary. *[Purpose of the 10-min. activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements.]*

At ~8:30am EST, the crewmembers held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Afterwards, at ~9:00am, the crew held the standard post-EVA debriefing session with ground specialists, discussing details of yesterday's spacewalk. *[EVA-5 by*

*Whitson and Malenchenko achieved all objectives except for the get-ahead task of installing handrail HR-0371 on Node-2. EV2 Malenchenko had problems getting the second bolt installed, almost identical to the problems reported during the 10A EVA-2. Repeated increases in installation torque put the handrail into an undefined and structurally unstable configuration, so the handrail was brought back inside. The crew also reported minor RTV (Room Temperature Vulcanizing) material damage to Malenchenko's EMU gloves. Glove photos are currently under review.]*

Dan Tani filled out the regular FFQ (Food Frequency Questionnaire), his first, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Yuri Malenchenko used the SKDS CMS (Pressure Control & Atmosphere Monitoring System/Countermeasure System) to take readings of potentially harmful contaminants in the SM (Service Module). The hardware was then returned to initial stowage. *[The CMS uses preprogrammed microchips to measure Formaldehyde (H<sub>2</sub>CO, methanal), Carbon Monoxide (CO) and Ammonia (NH<sub>3</sub>), taking one measurement per microchip.]*

Later, Malenchenko took CWC (Contingency Water Container) #1069 to the Russian Segment for the periodic (about twice a month) replenishing of the Elektron oxygen generator's water supply for electrolysis, filling the KOV thermal loops' EDV container, also vom CWC #1029 if necessary). Once filled, the EDV was connected to the BPK transfer pump for processing. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

CDR Whitson worked on stowage relocation from Node-2, preparing "Harmony" for the relocation on 11/14.

At ~7:05am, Yuri had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop).

Dan Tani had another 60 minutes for general crew orientation (station familiarization & acclimatization), as is standard daily rule for the first two weeks after starting station residency.

Malenchenko performed the regular daily maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM.

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Dan then transferred the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

### **Weekly Science Update** (*Expedition Sixteen -- 3<sup>rd</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS)*: Radiation measurements will continue to be performed throughout the Increment 16.

*ANITA*: Completed.

*BCAT (Binary Colloidal Alloy Test)*: Reserve.

*CARDIOCOG-2*: Completed.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS)*: “Dan, thanks for volunteering your time for the first CCISS session. The Investigator team is very pleased to have you as a subject. We’ve been able to look over some of the data and so far it looks good.”

*CFE (Capillary Flow Experiment)*: Planned.

*CHROMOSOME-2 (E14 SFP)*: Completed.

*CSI-2/CGBA (CGBA Science Insert #2/Commercial Generic Bioprocessing Apparatus)*: “We have received CHab and Cell Culture Hab (just returned from CSI-02). At first glance: CHab seems to have inoculated and grown well (Yeast). One of the Cell Culture Hab opticells containing the orchid cells was contaminated, the other looked good. It appears the *arabidopsis* did not grow well in the flight or ground units but further checking is required to confirm. If true, this is most likely due to low initial cell counts. The tree cells grew more and differently in flight compared to both grounds. It was obvious at a glance. More detail to follow.”

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2)*: Complete.

*CSLM-2 (Coarsening in Solid-Liquid Mixtures 2):* Planned.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Complete.

*EMCH (Elastic Memory Composite Hinge):* Complete.

*EPO (Educational Payload Operation) Kit C:* Planned.

*ETD (Eye Tracking Device):* First session for Yuri Malenchenko has been performed nominally on 10/18.

*Integrated Immune:* “Peggy and Dan, thanks for your time and participation in the first Integrated Immune session. So far the PI has received strong, viable samples for analysis.”

*IMMUNO (Saliva Sampling):* Inc-15 first session samples have been returned on 10A. First report confirms good transportation to ground.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 “Pirs”.

*MULTIGEN-1:* Since last report on 11/1, the scientists have intensively observed the stem that appeared in the A2 Experiment Container. Images acquired by EMCS have indicated that there exist weak circumnutation motions in 0-g and 1-g conditions. This was never observed in the past space experiments. From 10/30 on, side shoots have also been observed. 2D then 3D-recordings of stem circumnutation - in 0-g and 1-g conditions and in light and darkness conditions - have been performed for several days, making use of any possibility to get additional science between the planned power outages during the 10A mission. Before the end of the experiment run (scheduled on 11/10), it is expected that flowering and pollenization will occur, leading possibly to seeds that may be collected by the science team after return with 1E mission. Experiment Container A2 is currently in dry-out mode, progressively decreasing its relative humidity level. The EMCS Facility will be switched off and 8 Experiment Containers will be removed from EMCS on 11/15 and stowed until return on 1E.

*MSG-SAME (Microgravity Science Glovebox):* Complete.

NEOCYTOLYSIS (E14 SFP): Complete.

NOA-2 (Nitric Oxide Analyzer): Planned.

NUTRITION: Planned.

PMDIS (Perceptual Motor Deficits in Space): Complete.

SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems): n/a

SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight): "Peggy, thanks for performing the Sleep Actiwatch download for yours and Dan's Actiwatch. Also thanks for downloading the data for the CCISS experiment. We've looked at some of the data and so far everything looks good. We heard the good news that it was easy to use the neoprene band on the Actiwatch Reader, and we look forward to the download next month of the Actiwatches. Please feel free to perform any extra logbooking in the SleepLog software per your preference. Dan, thanks for your participation in Sleep so far. The data is looking good. Please feel free to perform any extra logbooking in the SleepLog software per your preference."

SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite): Planned.

Swab (Characterization of Microorganisms & Allergens in Spacecraft): In progress.

TRAC (Test of Reaction & Adaptation Capabilities): Planned.

CEO (Crew Earth Observations): Planned.

CEO (Crew Earth Observation) photo targets uplinked for today were **Tigris-Euphrates Delta** (the crew was asked to shoot the coastline under and left of track. Draining of swamplands just upstream of the delta [by the previous Iraqi government] has released vast quantities of sediment into the rivers. The shape of the coastline has consequently changed as the sediment has poured in), and **West African dust event** (Dynamic event. A dust mass several hundred km wide is moving off the coast of West Africa into the Atlantic Ocean. Saharan dust reaches the Americas every month, and may be critical in seeding Amazon basin soils with critical nutrients. Looking left for the densest part).

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

- 11/12/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-5)
- 11/14/07 -- Node-2 (Harmony) plus PMA-2 relocation to front of Lab
- 11/20/07 -- US EVA-10 (Peggy Whitson/Dan Tani)
- 11/24/07 -- US EVA-11 (Peggy Whitson/Dan Tani)
- 12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)
- 12/08/07 -- STS-122/Atlantis/1E docking
- 12/15/07 -- STS-122/Atlantis undocking
- 12/18/07 -- STS-122/Atlantis landing
- 12/22/07 -- Progress M-61/26P undocking (DC1) & reentry
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- 12/25/07 -- Progress M-62/27P docking (DC1)
- 01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)
- 01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**
- 02/06/08 -- Progress M-62/27P undocking
- 02/07/08 -- Progress M-63/28P launch
- 02/09/08 -- Progress M-63/28P docking
- 02/14/08 -- ATV-1 docking (SM aft port)
- 02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)
- 02/16/08 -- STS-123/Endeavour/1J/A docking
- 02/27/08 -- STS-123/Endeavour undocking
- 02/29/08 -- STS-123/Endeavour landing
- 04/08/08 -- Soyuz TMA-12/16S launch
- 04/10/08 -- Soyuz TMA-12/16S docking (DC1)
- 04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)
- 04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)
- 04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.
- 04/26/08 -- STS-124/Discovery/1J docking
- 05/02/08 -- STS-124/Discovery/1J undocking
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/09/07  
**Date:** Friday, November 09, 2007 12:17:33 PM  
**Attachments:**

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## ISS On-Orbit Status 11/09/07

All ISS systems continue to function nominally, except those noted previously or below.

**EVA-5 was completed fully successfully** in 6 hrs 55 min, accomplishing all objectives. One get-ahead task was left for a future excursion. During the spacewalk, CDR Peggy Whitson (EV1) and FE-1 Yuri Malenchenko (EV2), supported by FE-2 Dan Tani as IV (Intravehicular) crewmember ---

- *Stowed SSPTS (Station-to-Shuttle Power Transfer System) Cabling;*
- *Stowed PMA-2/Lab Umbilicals, prepping PMA-2 for its relocation on 11/12;*
- *Retrieved a Lab CETA (Crew & Equipment Translation Aid) Light;*
- *Temp stowed Node-2 Port & Starboard Tray Avionics;*
- *Installed Node-2 PDGF (Power & Data Grapple Fixture) Horseshoe Connectors & harness;*
- *Removed & replaced RPCM (Remote Power Controller Module) 4B-C on S0 truss;*
- *Removed ACBM (Active Common Berthing Mechanism) Cover & surveyed the CBM;*
- *Mated S0/Node-1 SM Power Cable;*
- *Configured PMA-1/FGB H-Jumpers;*
- *Retrieved a BSP (Baseband Signal Processor); and*
- *Relocated the N<sub>2</sub> VTE (Vent Tool Extender) bag.]*

Not done: Installing a Node-2 handrail (a get-ahead task).

*[Official start time of the spacewalk, the "left over" fifth EVA from Mission 10A, was 4:54am EDT. It ended at 11:49am. Total EVA duration (PET = Phase Elapsed Time) was 6h 55min. It was the 97<sup>th</sup> spacewalk for ISS assembly & maintenance and the 69<sup>th</sup> from the station (28 from Shuttle, 47 from Quest, 22 from Pirs) totaling 414h 47m. After today's EVA, a total of 115 spacewalkers (84 NASA astronauts, 21 Russians, and ten astronauts representing Japan-1, Canada-4, France-1, Germany-*

*1 and Sweden-3) have logged a total of 602h 11m outside the station on building, outfitting and servicing. It also was the 119<sup>th</sup> spacewalk by U.S. astronauts.]*

For safety, the spacewalkers had been advised to wear APMAs (Adjustable Protective Mitten Assemblies), i.e., overgloves, for the entire EVA except for the ACBM thermal cover and S0/N1 SM power cables tasks. *[Removing the APMAs was at the crew's discretion if they did not feel safe due to reduced body control or tool manipulation. Inspection of the EMU gloves was required before re-donning the over-glove.]*

FE-2 Dan Tani completed the post-ingress reconfiguration of the Russian onboard telephone/telegraph subsystem (STTS) to its pre-EVA settings. *[The "Voskhod-M" STTS enables telephone communications between the SM, FGB, DC1 Docking Compartment and U.S. segment (USOS), and also with users on the ground over VHF channels selected by an operator at an SM comm panel, via STTS antennas on the SM's outside. There are six comm panels in the SM with pushbuttons for accessing any of three audio channels, plus an intercom channel. Other modes of the STTS include telegraphy (teletype), EVA voice, emergency alarms, Packet/Email, and TORU docking support.]*

Dan also disassembled the Kodak-760 DCS digital camera's EVA configuration.

At ~2:00pm EST, Yuri will support the ground's reactivation of the Elektron O<sub>2</sub> generator at 32 amps by monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there is no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Before sleeptime (4:30pm EST), Peggy and Yuri are to take another session of the standard Russian crew health-monitoring program's medical assessment MO-9/ Biochemical Urinalysis. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

*AFPR Inspection Update:* Teams are continuing to analyze the root cause of the cut EMU spacesuit gloves. No defects were observed on the retrieved APFRs (Articulating Portable Foot Restraints) #3 & #7 during their recent inspection by

Whitson. A possible cause could be crew technique or translation paths.

No CEO (Crew Earth Observations) target uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:30am EST [= epoch]):

Mean altitude -- 341.9 km

Apogee height -- 343.4 km

Perigee height -- 340.2 km

Period -- 91.37 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0002365

Solar Beta Angle -- -35.0 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 115 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51370

**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

11/12/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on EVA-5 on 11/9)

11/14/07 -- Node-2 (Harmony) plus PMA-2 relocation to front of Lab

11/20/07 -- US EVA-10 (Peggy Whitson/Dan Tani)

11/24/07 -- US EVA-11 (Peggy Whitson/Dan Tani)

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)

12/08/07 -- STS-122/Atlantis/1E docking

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12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

**01/31/08 -- 50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**

02/06/08 -- Progress M-62/27P undocking

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch  
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04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
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09/13/08 -- Progress M-66/31P launch  
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09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch.**

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/08/07  
**Date:** Thursday, November 08, 2007 2:29:15 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/08/07**

All ISS systems continue to function nominally, except those noted previously or below.

In preparation for tomorrow's EVA-5, CDR Whitson and FE-1 Malenchenko, before breakfast, took the standard pre-EVA session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

Spending time in the Airlock (A/L), Peggy and Yuri completed A/L EL (Equipment Lock) configuration for their spacewalk tomorrow and tagged up with ground specialists at MCC-H to discuss details. As part of last-minute preparations, the spacewalkers installed the regenerated METOX (Metal Oxide) CO<sub>2</sub> absorber canisters in their EMUs (Extravehicular Mobility Units) and underwent the standard pre-EVA PMC (Private Medical Conference).

Dan Tani configured the DCS-760 digital camera to be taken outside and recharged its battery.

FE-1 Malenchenko performed a software upgrade for the BSPN payload server by deleting old files on the RSS1 laptop and installing the new software, uplinked overnight. Afterwards, the new load was tested with a communications check between RSS1 and BSPN. *[In preparation for today's upgrade, on 10/29 Malenchenko had conducted the periodic time synchronization between the RSS1 and the BSPN. Before RSS1/BSPN synchronization, the RSS1 is updated with the exact time as per the station clock (which in turn is synchronized daily from RGS/*

*Russian Ground Site). Experiment control application is a payload file transfer program called ShellForKE.]*

Yuri prepared three Russian “Pille-MKS” radiation dosimeters, recorded their dosages and equipped each of the two EMUs (Extravehicular Mobility Unit) with a radiation sensor (A0309/CDR & A0310/FE-2). *[A third sensor, A0308, was placed in the SM on the PULT reader for background readings.]*

At ~1:20pm, the crew conducted its first weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio.

At ~2:50pm EST, Whitson and Malenchenko are beginning their overnight Campout prebreathe and lockout in the A/L for denitrogenation.

EVA-5 will start tomorrow (Saturday) at ~5:55am EST and last an estimated 6h 35min, nominally ending at 12:30pm. Dan Tani will support the spacewalk as IV (Intravehicular) crewmember, sharing in the initial pre-breathe.

*[Main objectives of EVA-5 are:*

- *Stow SSPTS (Station-to-Shuttle Power Transfer System) Cable;*
- *Stow PMA-2/Lab Umbilicals;*
- *Remove Lab CETA (Crew & Equipment Translation Aid) Light;*
- *Temp stow Node-2 Port & Starboard Tray Avionics;*
- *Install Node-2 PDGF (Power & Data Grapple Fixture) Horseshoe Connectors & harness;*
- *R&R RPCM 4B-C (Remove & Replace Remote Power Controller Module) on S0 truss;*
- *Remove ACBM (Active Common Berthing Mechanism) Cover/survey CBM;*
- *Mate S0/Node-1 SM Power Cable;*
- *Configure PMA-1/FGB H-Jumpers;*
- *Retrieve BSP (Baseband Signal Processor);*
- *Relocate N<sub>2</sub> VTE (Vent Tool Extender) bag; and*
- *Install Node-2 handrail.]*

The FE-2 powered down the ham radio equipment in SM (Service Module) and FGB at ~12:30pm to prevent RF interference with the EMUs during the spacewalk.

Malenchenko performed the regular daily maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM.

Yuri also serviced the SM's ASU toilet facilities systems/replaceables, performing the periodic replacement of the toilet's urine receptacle (M-P) and filter insert (F-V), plus associated hoses and a sensor, and stowing the old units for disposal.

Peggy conducted the weekly 10-min. CWC audit as part of the continuing WDS (Water Delivery System) assessment of onboard water supplies. *[Updated “cue cards” based on the crew’s water callowns are sent up every other week.]*

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR), RED resistive exercise device (CDR, FE-1, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Dan then transferred the crew’s exercise data file to the MEC for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Dan also had another 60 minutes for general crew orientation (station familiarization & acclimatization), as is standard daily rule for the first two weeks after starting station residency.

*PMA-2 Robotics Preps:* At ~8:15-10:15am EST, the MT (Mobile Transporter) was moved by ground commanding from WS-8 (Worksite 8) to WS-4 and the SSRMS (Space Station Remote Manipulator System) was maneuvered to the Lab PDGF (Power & Data Grapple Fixture) pre-grapple position in preparation for the PMA-2 relocation planned for 11/12. Also, the Cupola and Lab RWSs (Robotics Workstations) were to be powered up for tomorrow’s EVA-5; the SSRMS will then walk off to the Lab PDGF and prepare for PMA-2 operations on 11/11. DOUG (Dynamic Orbital Ubiquitous Graphics) notes and procedures for the PMA-2 and Node-2 relocations were uplinked for the crew.

*CDRA Powerdown:* The Carbon Dioxide Removal Assembly (CDRA) in the Lab was deactivated by the ground during 7:00am-12:00pm EST.

*RED Cord Replacement:* On 11/1, the crew nominally completed changeout of the Resistive Exercise Device (RED) cords. During review of downlinked imagery specialists noted that the cords had been inadvertently installed backwards. The crew was informed to not extend the cord past the 40 inch mark during exercise to preclude damage to the system. The crew reported that they have used RED several times and have not extended the cord past 28 to 32 inches. Ground teams are analyzing forward plans.

CEO (Crew Earth Observation) photo targets uplinked for today were **Lake Eyre, Australia** (*Lake Eyre is a large, usually dry lakebed in south-central Australia and the lowest part of a larger basin that drains nearly a seventh of the continent. It has a complex cycle of filling and drying, not completely linked to the ENSO [El Niño-*

*Southern Oscillation Cycle]. As we are entering a La Niña this winter and have no recent photographs, CEO would like some baseline imagery of conditions in and around the lake. This pass was to the NE of the lake in afternoon sun), **Lake Nasser, Toshka Lakes, Egypt** (these man-made lakes are located in the Egyptian Desert west of Lake Nasser and the Nile River. We have monitored their formation and evolution for the past decade. After expanding rapidly westward for several years of high river flow in the Nile, recent images suggest that they are now in retreat. Requested are context mapping views of these lakes or what is left of them), and **Tin Bider Impact Crater** (this 70-million year old impact site is located in central Algeria just south of the extensive sand sea known as the Grand Erg Oriental. On this pass in early afternoon sun the target was left of track. Since the crater itself is just 6-km in diameter, the ground requested only context views this time).*

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/07/07  
**Date:** Wednesday, November 07, 2007 1:09:28 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/07/07**

All ISS systems continue to function nominally, except those noted previously or below.

After 12d 17h 57min in space, **STS-120/Discovery today returned to Earth**, touching down at KSC on the first landing opportunity at 1:02pm EDT, after 238 orbits, 6,250,000 st.mi. and a perfect ISS 10A mission, during which its seven-member crew conducted four EVAs, delivered a new Expedition 16 crewmember (FE-2 Dan Tani) and returned his predecessor (FE-2 Clay Anderson). It was the 120<sup>th</sup> flight of a Space Shuttle, the 23<sup>rd</sup> shuttle mission to visit the station and the 34<sup>th</sup> of Discovery. *Welcome back, Discovery! Next up: STS-122/Atlantis on December 6 with the Columbus module – ESA's BIG day.*

Before breakfast, CDR Whitson, FE-1 Malenchenko and FE-2 Tani started the day with the periodic session of the Russian biomedical routine assessments PZEh-MO-7/Calf Volume Measurement and PZEh-MO-8/Body Mass Measurement (second for CDR & FE-1, first for FE-2), using the IM mass measurement device which Yuri Malenchenko afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

At ~2:30am EST, Yuri supported the ground's reactivation of the Elektron O<sub>2</sub> generator at 32 amps by monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was

no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

After the EMCS (European Modular Cultivation System) facility was powered down by ground command, Dan Tani manually closed the EMCS gas valves (must be done within 24 hours following the remote powerdown).

Dan also retrieved nine -32 degC ICEPAC belts from stowage and placed them into the MELFI (Minus Eighty-Degree Laboratory Freezer for ISS) Dewar 3. *[Tray A/Section 1 & 4; Tray B/Section 1 & 4; Tray C/Section 1, 2, 3 & 4; Tray D/Section 1.]*

After the FE-2 had printed out the uplinked timeline/procedures for the EVA-5 by Whitson & Malenchenko on Friday (11/9), the crewmembers spent two hours reviewing the material, followed by a teleconference with ground personnel to discuss details. Afterwards, Peggy and Yuri checked out REBA (Rechargeable EMU Battery)-powered hardware in the Airlock and configured the EVA tools needed for the spacewalk.

*[After the standard Campout in the A/L Thursday night, EVA-5 is scheduled to begin at approximately 6:00am EST. Expected to last about 6h 35m, its objectives are:*

- *Stow SSPTS (Station-to-Shuttle Power Transfer System) Cable;*
- *Stow PMA-2/Lab Umbilicals;*
- *Remove Lab CETA (Crew & Equipment Translation Aid) Light;*
- *Temp stow Node-2 Port & Starboard Tray Avionics;*
- *Install Node-2 PDGF (Power & Data Grapple Fixture) Horseshoe Connectors & harness;*
- *R&R RPCM 4B-C (Remove & Replace Remote Power Controller Module) on S0 truss;*
- *Remove ACBM (Active Common Berthing Mechanism) Cover/survey CBM;*
- *Mate S0/Node-1 SM Power Cable;*
- *Configure PMA-1/FGB H-Jumpers;*
- *Retrieve BSP (Baseband Signal Processor);*
- *Relocate N<sub>2</sub> VTE (Vent Tool Extender) bag; and*
- *Install Node-2 handrail.]*

In support of the on-going EMU/spacesuit glove troubleshooting, the CDR had an hour set aside to inspect and photograph the two retrieved EVA APFRs (Articulating Portable Foot Restraints) #3 & #7 for any sharp edges that may have caused the glove damage.

Peggy also performed the regular monthly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), inspecting the condition of harnesses, belt slats,

corner bracket ropes, IRBAs (Isolation Restorative Bungee Assemblies) and gyroscope wire ropes for any damage or defects, lubricating as required plus recording time & date values.

Dan completed the periodic check of active U.S. payloads, i.e., cleaning the ANITA (Analyzing Interferometer for Ambient Air) inlet plus inspecting and filter cleaning of the CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to Earth.]*

Terminating the 24-hr passive data collection period of the HRF CCISS (Human Research Facility/Cardiovascular & Cerebrovascular Control on Return from ISS) experiment, the FE-2 disassembled and stowed the CCISS hardware, used for his first two-day session.

Yuri Malenchenko set up the equipment for tomorrow's planned "Urolux" biochemical urine test (PZE MO-9), standard operating procedure for cosmonauts before & after each EVA.

FE-2 Tani connected the regular ITCS LTL (Internal Thermal Control System/Low Temperature Loop) coolant jumper connection to the LAB1D6 rack in support of the ground-commanded activation of the U.S. CDRA (Carbon Dioxide Removal Assembly), and Houston lowered the temperature setpoint to the regular 9.4 degC. *[CDRA activation took place at 6:35am-7:05am EST.]*

Dan Tani also had another 60 minutes for general crew orientation (station familiarization & acclimatization), as is standard daily rule for the first two weeks after starting station residency.

The FE-2 performed the regular daily maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including routine ASU toilet facilities replacements.

Malenchenko did the daily maintenance of the IMS (Inventory Management System), updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Dan then transferred the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

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Solar Beta Angle -- -44.2 deg (magnitude decreasing)

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12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**

02/06/08 – Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
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04/??/09 -- **Six-person crew on ISS**  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/06/07  
**Date:** Tuesday, November 06, 2007 11:54:54 AM  
**Attachments:**

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## **ISS On-Orbit Status 11/06/07**

All ISS systems continue to function nominally, except those noted previously or below. *Crew rest day.*

Station sleep cycle is now back to the regular 1:00am – 4:30pm EST.

For FE-2 Dan Tani, it was Day 1 of the two-day activities of the HRF CCISS (Human Research Facility/Cardiovascular & Cerebrovascular Control on Return from ISS) experiment. CDR Peggy Whitson assisted with electrode placement and documentary photography. *[CCISS studies the effects of long-duration spaceflight on crewmembers' heart functions & blood pressure (=“cardiovascular”) and on the blood vessels that supply the brain (=“cerebrovascular”). Learning more about the changes in cardiovascular & cerebrovascular systems in zero-G could lead to specific countermeasures that might better protect future space travelers. Today’s activities focus on hardware set-ups including the Holter harness for heart rate monitoring (with PCMCIA card), the CBPD (Continuous Blood Pressure Device) cuffs, and two Actiwatches (not the same as for SLEEP). For the Baro study of CCIS, using finger cuffs, heart rate and blood pressure were recorded for resting and timed breathing for 5 min. Between today and tomorrow, there is also a 24-hr passive data collection period. Exercise, caffeine or food are not allowed prior to the Baro study.]*

Peggy Whitson worked on updating and deploying new SODF (Station Operation Data File) Warning Books. *[The new books are valid for post-P6 activation. They are deployed in the Lab, Service Module (SM), and FGB.]*

FE-1 Yuri Malenchenko performed the regular daily maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including routine ASU toilet facilities replacings.

The crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS

cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Yuri then transferred the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~7:35am EST, the FE-1 downlinked two PAO TV messages of greetings via S-band to TsUP/Moscow: (1) to Yaroslavl Region Militia Officers on the Day of Militia ("*... Yaroslavl Militia honorably and courageously protects law and order at the birthplace of Valentina Vladimirovna Tereshkova, Hero of the Soviet Union and first woman cosmonaut...*"); (2) the other to TsUP Director Vladimir Ivanovich Lobachev who will have his 70<sup>th</sup> birthday on 11/8 ("*...for almost a quarter of a century, you've been at the helm of the Mission Control Center. We know that you started your professional career working under the direct supervision of Sergei Pavlovich Korolev... Vladimir Ivanovich, we would like to express our deep gratitude to you for your truly fatherly care for us space workers. Once again, happy birthday to you!*")

Later, at ~8:40am, FE-2 Dan Tani held a crew conference via Ku- & S-band with the next FE-2, Garrett Reisman, who will be his successor after arriving on STS-123 in February next year. [*Performed every other week, these 30-min. crew conferences are being included in the current station crew's schedule to pass on the lessons learned to the upcoming Expedition Crew. The purpose is to begin the handover process prior to the arrival on orbit through Videocons and Data Exchanges between the current crew and the upcoming crew. These tagups should start toward the end of the 1<sup>st</sup> month on orbit.*]

*EWIS Update:* After FE-2 Tani yesterday reconnected EWIS (External Wireless Instrumentation System) 1553 cabling in the Lab, EWIS has been successfully activated. [*The structural dynamics measuring system is monitoring in "trigger" mode dynamics of the P4, P5 and S4 truss segments. Data of the activation are currently being reviewed by engineers.*]

**STS-120 Landing Preview:** For tomorrow's planned touchdown of STS-120/Discovery, KSC has two opportunities: i.e., from Orbits 238 & 239. Weather at KSC is forecast GO.

- *First opportunity (Orbit 238):*  
Deorbit Burn (TIG) – 12:00pm EST  
Landing --- 1:02pm;
- *Second opportunity (Orbit 239):*  
Deorbit Burn (TIG) – 1:34pm

Landing – 2:36pm

No CEO (Crew Earth Observations) target uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 4:54am EST [= epoch]):

Mean altitude -- 342.1 km

Apogee height -- 344.3 km

Perigee height -- 340.0 km

Period -- 91.38 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0003148

Solar Beta Angle -- -48.6 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 70 m (Shuttle-caused delta-V)

Revolutions since FGB/Zarya launch (Nov. 98) -- 51321

**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

11/07/07 -- STS-120/Discovery/10A landing @ KSC (FD16/1:02pm EST)

11/09/07 -- EVA-5 (Peggy Whitson/Yuri Malenchenko)

11/12/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-5)

11/14/07 -- Node-2 (Harmony) plus PMA-2 relocation to front of Lab

11/20/07 -- US EVA-10 (Peggy Whitson/Dan Tani)

11/24/07 -- US EVA-11 (Peggy Whitson/Dan Tani)

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/05/07  
**Date:** Monday, November 05, 2007 1:31:43 PM  
**Attachments:**

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## **ISS On-Orbit Status 11/05/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 3 of Increment 16.*

### **STS-120/Discovery and ISS are flying in separate orbits again (Flight Day 14 for STS-120/10A)**

After final preparations on both sides of the hatches (closed yesterday at 2:42pm EST), Discovery this morning undocked smoothly at 5:32am from PMA-2 (Pressurized Mating Adapter 2), after a total docked time of 10d 21h 52min. *[For undocking, the station was turned ~180 deg to +XVV ZLV (+x-axis in velocity vector, z-axis in local vertical) at 4:28am, put briefly on free drift for the undocking, and then maneuvered to 10A Stage attitude of +XVV TEA attitude at 6:15am.]*

KSC landing is nominally expected on 11/7 (Wednesday) at ~1:02pm EST. *[If the landing occurs as planned, Discovery's mission duration will be 15d 2h 24m.]*

Aboard the station, the crew is enjoying a light-duty day. Wakeup for CDR Peggy Whitson, FE-1 Yuri Malenchenko and FE-2 Dan Tani was at ~1:40am. Sleep time tonight: 4:30pm EST.

After the CDR prepared the auditory test equipment, she, FE-1 Malenchenko and FE-2 Tani took the periodic O-OHA (on-orbit hearing assessment) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC laptop application. It was the first session for the three crewmembers. *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still*

*be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month. Note: There have been temporary hearing deficits documented on some U.S. and Russian crewmembers, all of which recovered to pre-mission levels.]*

With the U.S. CDRA (Carbon Dioxide Removal Assembly) deactivated by the ground late last night (~10:30pm EST) and its cooling no longer required, Whitson demated and took down the ITCS LTL (Internal Thermal Control System/Low Temperature Loop) jumper at the CDRA-supporting LAB1D6 rack.

Both Dan Tani and Peggy Whitson used the DCS760 digital cameras and PD-100 camcorder to document the undocking, backing away and separation of the Discovery. Tani later conducted the playback for transmitting the footage to the ground.

FE-1 Malenchenko performed the periodic MLI (Multi-Layer Insulation) Nikon D2X photography on Soyuz TMA-11/15S, docked at the FGB nadir port, from the DC1 EVA hatch 2 window, to assess the condition of the spacecraft's MLI (Multi-Layer Insulation) material.

After the crew reconfigured the PMA-2-to-Lab vestibule last night in preparation for PMA-2 demate & relocation to Node-2, removed the CBM (Common Berthing Mechanism) ground strap and connected the CBM bolt actuator to load cell sensor, Yuri opened the Lab hatch to the PMA-2 today, to verify that all Kapton tape is removed from the PMA-2 grille and that the Velcro grille cover is off of the PMA-2 hard duct.

CDR Whitson later performed the remaining preparatory PMA-2 tasks. *[Work items consisted of disconnecting the O<sub>2</sub> & N<sub>2</sub> recharge lines, installing the four CBM CPAs (Controller Panel Assemblies (CPA)), installing the CBCS (Centerline Berthing Camera System) target assembly, removing all stowage & tools from PMA-2, verifying CBM hardware config, conducting photo documentation, and installing the Lab forward hatch thermal cover.]*

Afterwards, Dan Tani removed the PMA-2 ventilation air duct, closed the Lab forward hatch, depressurized the PMA-2 and performed a leak check of the Lab fwd hatch (several times).

The new Exp-16 crew, Peggy, Yuri & Dan, performed a one-hour OBT (onboard training) emergency egress drill. *[Purpose of the refresher drill was to familiarize the entire crew with Node-2 hardware and valves used in emergency situations, familiarize Dan Tani with the locations of ISS hardware and the positions of valves*

*used in emergency situations as well as the translation routes to the Soyuz crew return vehicle, working through the Russian Segment (RS) hardware deactivation procedures, and practicing crew interactions in emergency situations.]*

In the Airlock, the two spacewalkers on EVA-5 next Friday (11/9), Whitson and Malenchenko, relocated and configured their EMU (Extravehicular Mobility Unit) spacesuits, i.e., EMU #3006 on the forward EDDA (EMU Don Doff Assembly), #3018 on the aft EDDA. *[After terminating recharge of the suit batteries and regeneration of the METOX (Metal Oxide) filter canisters, Peggy and Yuri installed both batteries and canisters in the EMUs. Afterwards, they verified proper configuration for helmet lights, video cameras (ERCAs), identification stripes, wrist mirrors and cuff checklists.]*

The CDR also deconfigured the BPSMU (Battery Powered Speaker Microphone Unit) and its long drag-through cable, used during the docked phase, and stowed the equipment.

Malenchenko completed the post-undocking reconfiguration of the Russian telephone/telegraph subsystem (STTS) to its pre-docked settings, from its primary string back to nominal mode on the backup string. This also severed the VHS (UHF) channel to the receding Shuttle Orbiter and restored the RSA-2 S/G (Space-to-Ground) comm configuration on Panel 3. *[The "Voskhod-M" STTS enables telephone communications between the SM, FGB, DC1 Docking Compartment and U.S. segment (USOS), and also with users on the ground over VHF channels selected by an operator at an SM comm panel, via STTS antennas on the SM's outside. There are six comm panels in the SM with pushbuttons for accessing any of three audio channels, plus an intercom channel. Other modes of the STTS include telegraphy (teletype), EVA voice, emergency alarms, Packet/Email, and TORU docking support.]*

FE-2 Tani rerouted an EWIS (External Wireless Instrumentation System) 1553 cable in the Lab, disconnecting it, then reconnecting it behind another panel and closing the panel cover.

As is regular procedure for newly arrived cosmonauts, the FE-1 spent some time filling out the questionnaire for the standard Russian biomedical Braslet-M/Anketa ("bracelet/questionnaire") test procedure. *[The objective is for Yuri to evaluate a number of "bracelet" cuffs for their usefulness in suppressing the adverse effects of micro-G for the "newcomer" aboard the station during the acute phase of adaptation to weightlessness, if there are such indications. The "bracelets" are compression cuffs attached to a belt and worn on the upper thighs over the coveralls, intended as countermeasures against the initial micro-G effects of blood filling (vascularity) in the upper torso (heaviness and blood pulsation in the head), facial puffiness, nasal*

*stuffiness, painful eye movement, and vestibular disorders (dizziness, nausea, vomiting). They create artificial blood accumulation in the upper thirds of the thighs, causing some of the circulating blood volume to relocate from the upper body to the lower extremities, thereby (hopefully) correcting the adverse hemodynamic effect of micro-G and thus improving the crewmember's working capability. The actual compression cuff in the Braslet units is a combination of alternating multi-layer tensile and non-tensile elements, whose distension by body movements creates elastic forces that produce the necessary pressure on the body surface.]*

At ~8:50am, Yuri supported the ground's reactivation of the Elektron O<sub>2</sub> generator at 32 amps by monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Later, the FE-1 performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including routine ASU toilet facilities replacings.

ISS crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR), and VELO bike with bungee cord load trainer (FE-1).

Yuri then transferred the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*Payload Transfers:* As part of ISS-to-Shuttle transfers yesterday, the crew packed science samples and ICEPACs in two DCBs (Double Coldbags) on Discovery before hatch closure. When Clay Anderson ran into some difficulties packing one of the bags during these activities, he was instructed to remove seven NUTRITION samples from one of the bags and re-stow them in the MELFI (Minus Eighty-Degree Laboratory Freezer for ISS) until the next flight.

*Water Transfers:* A total of 10 CWCs (Contingency Water Containers) were transferred from Discovery to the station. CDR Whitson reported that a CWC (#1006), previously filled and transferred, was found to be leaking. The CWC was returned to the Shuttle, to be vented overboard during a post-undock water dump.

No CEO (Crew Earth Observations) target uplinked for today.

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Eccentricity -- 0.0002835

Solar Beta Angle -- -52.7 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

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Revolutions since FGB/Zarya launch (Nov. 98) -- 51308

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11/14/07 -- Node-2 (Harmony) plus PMA-2 relocation to front of Lab

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11/24/07 -- US EVA-11 (Peggy Whitson/Dan Tani)

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/04/07  
**Date:** Sunday, November 04, 2007 3:03:40 PM  
**Attachments:** [image001.gif](#)

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## ISS On-Orbit Status 11/04/07

All ISS systems continue to function nominally, except those noted previously or below. *Day 150 for Clayton Anderson. Flight Day 13 for STS-120/10A; Day 11 of Joint Ops. Sunday – Farewell Day.*

>>> **Today 50 years ago the first living space passenger was launched into orbit: the female dog Laika on Soviet Russia's Sputnik-2** (see picture, below).

<<<

ISS/Shuttle crew wake-up: 1:08am EST. Sleeptime: 5:10pm (ISS), 6:08pm (Shuttle).

After a touching (and a bit tearful) Crew Farewell at ~2:25pm EST, hatches between ISS and Discovery were closed at 2:42pm. **What an unbelievably successful mission!**

Shuttle Undocking is scheduled tomorrow at 5:32am. *[Since PMA-2 cabling has not been disconnected as originally planned for EVA-5, the automatic undocking software for the PMA-2 departure under Russian thruster control will still be used. The procedure provides for the crewmember to stand by with a stopwatch and to take over the automatic operational attitude control sequence manually if the software does not resume control after the period of free drift a few minutes after physical separation.]*

For CDR Whitson and FE-2-16 Dan Tani, the day began with their fifth session with the INTEGRATED IMMUNE (Validation of Procedures for Monitoring Crew Member Immune Function) experiment, today collecting “dry” saliva samples for Dan five times during the morning hours (using special filter paper), plus blood samples from both, drawn by Dr. Scott Parazynski. All samples were then to be stored on the Shuttle for return. *[The experiment integrates studies of neuroendocrine & immune responses in humans during and after long-term stay at ISS to provide an understanding for the development of pharmacological tools to countermeasure unwanted immunological side effects during long-duration missions in space (Moon*

*& Mars). Immune protocol requires the collection to occur first thing post-sleep, before eating, drinking and brushing teeth, and all samples are stored at ambient temperature. Previous observations suggest that space flight might have a negative impact on different elements of the immune system; possible causes are the effects of microgravity on the body, stress and radiation exposure. However, the fact that there have been very few infections of astronauts makes it difficult to translate observations of immune system changes into a risk assessment.*

*Integrated Immune is the first study that will comprehensively monitor the performance of the immune system before, during and after space flight missions of long and short durations.]*

Both crews worked busy morning hours to prepare for the hatch closing:

FE-1 Malenchenko disassembled the gas transfer equipment used for supplying Shuttle oxygen (O<sub>2</sub>) for EVA prebreathing in the Airlock (A/L).

CDR Whitson collected and restowed the recharge hoses that were used for transferring O<sub>2</sub> and N<sub>2</sub> (nitrogen) from the Shuttle to the high-pressure tanks outside the A/L, onto their PMA-2 (Pressurized Mating Adapter 2) stowage brackets

In the A/L, Peggy reconfigured Doug Wheelock's EMU (Extravehicular Mobility Unit) from yesterday's EVA-4 for her own use during the EVA-5 with Dan Tani next Thursday (11/8), which was deferred from the 10A docked period. Parazynski's EMU was transferred back to the Shuttle. *[EVA-5 tasks, estimated to take ~6.5 hrs, include: 1. Stow SSPTS (Station-to-Shuttle Power Transfer System) cabling; 2. Stow PMA-2/Lab umbilicals; 3. Retrieve Lab CETA (Crew & Equipment Translation Aid) light; 4. Temp stow Node-2 starboard tray avionics umbilicals; 5. Remove & stow ACBM (Active Common Berthing Mechanism) cover & survey CBM; 6. Install Node-2 "horseshoe" connectors on PDGF (Power & Data Grapple Fixture); 7. Mate a power cable; 8. Retrieve BSP (Baseband Signal Processor); 9. Configure PMA-1/ FGB jumpers; 10. Remove & replace RPCM (Remote Power Controller Module) 4B-C on S0 truss; 11. Relocate N<sub>2</sub> VTE (Vent Tool Extender) bag; and 12. Install Node-2 handrail.]*

FE-2 Clay Anderson used part of his final day on the station for some last-minute handover activities with his successor, Dan Tani.

Clayton also turned on the VOA (Volatile Organic Analyzer) which is currently in a troubleshooting phase. *[After six consecutive hard shutdowns, VOA enters a diagnostic mode where the ground cannot communicate with it for several hours. That limit has almost been reached. In addition, VOA has exhibited several "funnies" as of late. Because a controlled powerdown might reset the instrument,*

*the FE-2 first switched it back on for allowing it to complete its activation and warm-up sequence, then commanded a “graceful” shutdown, from which ground will power-cycle the VOA RPC (Remote Power Controller) to return it to a good config.]*

Afterwards, Anderson joined Shuttle crewmembers in transferring return cargo to the Shuttle, going by uplinked detailed transfer lists and drawing on tagup support by ground specialists in Houston (MCC-H) and Huntsville (POC/Payload Operations Center).

For POC, Anderson and Tani packed payload samples and ICEPACs from MELFI (Minus-Eighty Laboratory Freezer for ISS) in two DCBs (Double Coldbags) for return on Discovery. MELFI will be powered down for undocking. *[Three cold samples will be coming down: NUTRITION, TROPI, and IMMUNO.]*

For the CSI-2/CGBA-5 (Commercial Generic Bioprocessing Apparatus 5/Science Insert-02) science experiment, Clay deactivated the payload, uncabled it for accessing its interior, removed the CSI-02 hardware and restored CGBA-5 to operation, powering it back on. *[POC is looking forward to forward to receiving CGBA-5’s CHab and Cell Culture Hab back soon. No germination has as yet been observed in the Plant Hab but additional watering could initiate the process.]*

FE-1 Malenchenko reconfigured two DCS-760 digital cameras used during the EVA, resetting them for nominal IVA use.

Yuri also conducted the (currently) daily job of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- and FGB-to-Soyuz tunnels, and the FGB-to-Node passageway.

Later, the FE-1 performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including ASU toilet facilities systems/replaceables plus the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Malenchenko also gathered weekly data on total operating time & “On” durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM’s SOGS air revitalization subsystem for reporting to TsUP.

ISS crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2-16), TVIS treadmill (CDR, FE-2), RED resistive exercise device (CDR), and VELO bike with bungee cord load trainer (FE-1).

Clay then transferred the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

### **Weekly Science Update** (*Expedition Sixteen – 2<sup>nd</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* A memory card exchange was performed nominally on 10/30. Radiation measurements will continue to be performed throughout the Increment 16.

*ANITA:* Completed.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2:* Completed.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS):* Planned.

*CFE (Capillary Flow Experiment):* Planned.

*CHROMOSOME-2 (E14 SFP):* Completed.

*CSI-2/CGBA (CGBA Science Insert #2/Commercial Generic Bioprocessing Apparatus):* On 11/2, the ground issued a command to the Cell Culture Hab to take the last sample on orbit before return. Once received on the ground, the specimens of CHab and Cell Culture Hab will be analyzed. Researchers found with ground testing that adding a few drops of water to the seed plugs in the Plant Hab will initiate germination due to the plugs drying out over time. They plan to implement the extra watering for future Plant Hab runs.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* Complete.

*CSLM-2 (Coarsening in Solid-Liquid Mixtures 2):* Planned.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Complete.

*EMCH (Elastic Memory Composite Hinge):* Complete.

*EPO (Educational Payload Operation) Kit C:* Planned.

*ETD (Eye Tracking Device):* First session for Yuri Malenchenko has been performed nominally on 10/18.

*Integrated Immune: In Progress*

*IMMUNO (Saliva Sampling):* Inc-15 first session samples are currently stowed in MELFI Dewar #2, to be returned on 10A.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* Since last report on 10/25, the scientists have intensively observed the stem that appeared in the A2 Experiment Container. This stem grows very fast, and images acquired by EMCS indicate that there exist weak circumnutation motions in 0-g conditions. This was never observed in the past space experiments. On 10/30, side shoots have also appeared and the plant is in very healthy condition. 2D then 3D-recordings of stem circumnutation - in 0-g and 1-g conditions and in light and darkness conditions -are pursued for several days, making use of any possibility to get additional science between the planned power outages during the 10A mission. Before the end of the experiment run (scheduled on 11/08–11/10, under discussion with POIC), it is expected that flowering and pollenization will occur, leading possibly to seeds that may be collected by the science team after return with 1E mission.

*MSG-SAME (Microgravity Science Glovebox):* Complete.

*NEOCYTOLYSIS (E14 SFP):* Complete.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION:* Planned.

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* n/a

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

CEO (Crew Earth Observations): Planned.

No CEO (Crew Earth Observations) target uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:34am EST [= epoch]):

Mean altitude -- 342.1 km

Apogee height -- 344.05 km

Perigee height -- 340.3 km

Period -- 91.38 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0002737

Solar Beta Angle -- -56.6 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 25 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51292

**Significant Events Ahead** (all dates Eastern Standard, some changes possible):

11/05/07 -- STS-120/Discovery/10A undocking (FD14/5:32am)

11/07/07 -- STS-120/Discovery/10A deorbit burn (FD16/10:44am EST)

11/07/07 -- STS-120/Discovery/10A landing @ KSC (FD16/11:44am EST)

11/08/07 -- EVA-5 (Peggy Whitson/Dan Tani)

11/12/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-5)

11/14/07 -- Node-2 (Harmony) plus PMA-2 relocation to front of Lab

11/20/07 -- US EVA-10 (Peggy Whitson/Dan Tani)

11/24/07 -- US EVA-11 (Peggy Whitson/Dan Tani)

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis undocking

12/18/07 -- STS-122/Atlantis landing

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

Note: The daily ISS On-Orbit Status reports can also be found at [http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/03/07  
**Date:** Saturday, November 03, 2007 2:37:30 PM  
**Attachments:**

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## ISS On-Orbit Status 11/03/07

All ISS systems continue to function nominally, except those noted previously or below. *Day 149 for Clayton Anderson. Flight Day 12 for STS-120/10A; Day 10 of Joint Ops. "It's been a great day!" (MS1 Scott Parazynski).*

*.....and thank God for the Canadian MSS!*

ISS/Shuttle crew wake-up: 1:38am EDT. Sleeptime: 5:38pm (ISS), 6:08pm (Shuttle).

**P6 Solar Array Wing 4B has been fully restored to service and is deployed for its entire length of 110 ft (33.5 m), under its nominal stretch load of ~70 lbs (32 kg).**

**EVA-4 was completed fully successful** in 7 hrs 19 min, accomplishing its objective by MS1 Scott Parazynski & MS2 Doug "Wheels" Wheelock, thanks to truly great team work:

- After approaching the damage site on the 4B inboard solar blanket on the OBSS/SSRMS (Orbiter Boom Sensor System/Space Station Remote Maneuvering System) combination, expertly "piloted" by Stephanie Wilson and Daniel Tani, Parazynski (EV1), closely monitored by Wheelock (EV2) at the 4B Mast base, inserted the first suture-like brace/stabilizer across the hinge at ~8:50am, cut a snarled guidewire and then installed the remaining four braces (~9:04-11:00am), each built the previous day by Peggy Whitson & George "Zambo" Zamka from existing jerry-rig materials (wires of specific lengths with a cufflink-like aluminum anchor on each end, plus lots of insulating tape). Having performed the delicate surgery, Physician-Astronaut Dr. Parazynski moved back to monitor the full extension of all remaining 4B Mast bays by the onboard crew, one-half bay at a time (finished at ~11:23am);
- Before terminating the spacewalk, the crew also completed the get-ahead task of retrieving APFR (Articulating Portable Foot Restraint) #3 for sharp-

edge inspection aboard the station.

*[Official start time of the spacewalk was 6:03am EDT (~32 min ahead of schedule). It ended at 1:22pm. Total EVA duration (PET = Phase Elapsed Time) was 7h 19m, bringing the EVA total for the four 10A EVAs to 27h 14m. It was the 96<sup>th</sup> spacewalk for ISS assembly & maintenance and the 68<sup>th</sup> from the station (28 from Shuttle, 46 from Quest, 22 from Pirs) totaling 407h 52m. After today's EVA, a total of 113 spacewalkers (83 NASA astronauts, 20 Russians, and ten astronauts representing Japan-1, Canada-4, France-1, Germany-1 and Sweden-3) have logged a total of 595h 16m outside the station on building, outfitting and servicing. It also was the 118<sup>th</sup> spacewalk by U.S. astronauts.]*

For CDR Whitson and FE-2-16 Dan Tani, the day began with their fourth session with the INTEGRATED IMMUNE (Validation of Procedures for Monitoring Crew Member Immune Function) experiment, today collecting “dry” saliva samples five times during the day (using special filter paper). *[The experiment integrates studies of neuroendocrine & immune responses in humans during and after long-term stay at ISS to provide an understanding for the development of pharmacological tools to countermeasure unwanted immunological side effects during long-duration missions in space (Moon & Mars). Immune protocol requires the collection to occur first thing post-sleep, before eating, drinking and brushing teeth, and all samples are stored at ambient temperature. Previous observations suggest that space flight might have a negative impact on different elements of the immune system; possible causes are the effects of microgravity on the body, stress and radiation exposure. However, the fact that there have been very few infections of astronauts makes it difficult to translate observations of immune system changes into a risk assessment. Integrated Immune is the first study that will comprehensively monitor the performance of the immune system before, during and after space flight missions of long and short durations.]*

Before spacewalk begin, FE-2 Anderson verified powerdown of onboard ham radio equipment (Kenwood in SM & Ericsson in FGB) to prevent RF interference with the EMUs.

Afterwards, Anderson rebooted all PCS (Portable Computer System) laptops at the Lab and Cupola Robotic Workstations (RWS) to ready them for the subsequent Robotics activities.

Also in preparation for the spacewalk, FE-1 Malenchenko retrieved a PBA (Portable Breathing Apparatus), consisting of an O<sub>2</sub> bottle and QDM (Quick-Don Mask), from a Node-1 ZSR (Zero-G Stowage Rack) locker and stowed it in the A/L EL (Airlock Equipment Lock). After the egress of the spacewalkers, Yuri returned the PBA to

its storage location on the ZSR.

Clay Anderson completed several outfitting tasks, first mounting hatch handle rings at the forward and aft hatches of Node-1, then moving to the Lab for similar guide assembly installations forward and aft.

The FE-2 also performed the periodic offloading of the Lab CCAA (Common Cabin Air Assembly) dehumidifier's condensate tank, filling a CWC (Contingency Water Container, #1062) with the collected water slated for processing. *[Estimated offload time before termination (leaving ~5.25 kg in the tank): ~25 min.]*

Later, Anderson deactivated the IWIS (Internal Wireless Instrumentation System, first downloading the recorded data of yesterday's Shuttle ergometer workout by Doug Wheelock to the SSC-2 (Station Support Computer 2) laptop for downlink, then tearing down the four RSUs (Remote Sensor Units) in Lab, Node, FGB & SM (Service Module) as well as the fifth RSU on the Shuttle middeck and the NCU (Network Control Unit) for subsequent stowage on the station.

FE-1 Malenchenko meanwhile conducted the (currently) daily job of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- and FGB-to-Soyuz tunnels, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently ten persons.]*

Later, Yuri conducted the routine maintenance of the SOZh (ECLSS/Environment Control & Life Support System) system in the SM, including ASU toilet facilities systems/replaceables.

Anderson did the daily maintenance of the IMS (Inventory Management System), updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

CDR Whitson again assisted the spacewalkers when they returned at ~1:25pm, handling CL (Crewlock) repress, joint A/L post-EVA ops, and setting up a DCS 760 camera for EMU glove inspection.

Also after the EVA, Malenchenko opened the protective shutter of SM window #9.

At ~2:55pm, Yuri supported the ground's reactivation of the Elektron O<sub>2</sub> generator at 32 amps by monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating.

*[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Peggy Whitson filled out the regular FFQ (Food Frequency Questionnaire), her second, on the MEC (Medical Equipment Computer). *[Erroneously reported as completed on 11/1. By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

ISS crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-1), TVIS treadmill (CDR, FE-1, FE-2), and RED resistive exercise device.

Clayton then transferred the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

No CEO (Crew Earth Observations) target uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** *(all dates Eastern, some changes possible. Also: Stage 10A is under reassessment):*

11/04/07 -- **50-Year Anniversary of launch of female dog Laika, first living space passenger, into orbit**

11/04/07 -- 2:00am: DST ends, ST begins

11/05/07 -- STS-120/Discovery/10A undocking (FD14/5:32am)

11/07/07 -- STS-120/Discovery/10A deorbit burn (FD16/10:44am EST)

11/07/07 -- STS-120/Discovery/10A landing @ KSC (FD16/11:44am EST)

TBD -- relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

TBD -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)  
 12/08/07 -- STS-122/Atlantis/1E docking  
 12/15/07 -- STS-122/Atlantis undocking  
 12/18/07 -- STS-122/Atlantis landing  
 12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
 12/23/07 -- Progress M-62/27P launch  
 12/25/07 -- Progress M-62/27P docking (DC1)  
 01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
 01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
 02/06/08 -- Progress M-62/27P undocking  
 02/07/08 -- Progress M-63/28P launch  
 02/09/08 -- Progress M-63/28P docking  
 02/14/08 -- ATV-1 docking (SM aft port)  
 02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
 02/16/08 -- STS-123/Endeavour/1J/A docking  
 02/27/08 -- STS-123/Endeavour undocking  
 02/29/08 -- STS-123/Endeavour landing  
 04/08/08 -- Soyuz TMA-12/16S launch  
 04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
 04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
 04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
 04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
 04/26/08 -- STS-124/Discovery/1J docking  
 05/02/08 -- STS-124/Discovery/1J undocking  
 05/14/08 -- Progress M-64/29P launch  
 05/16/08 -- Progress M-64/29P docking (DC1)  
 07/29/08 -- ATV-1 undocking (from SM aft port)  
 08/11/08 -- Progress M-64/29P undocking (from DC1)  
 08/12/08 -- Progress M-65/30P launch  
 08/14/08 -- Progress M-65/30P docking (SM aft port)  
 09/13/08 -- Progress M-66/31P launch  
 09/15/08 -- Progress M-66/31P docking (DC1)  
 09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
 10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
 10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
 10/14/08 -- Soyuz TMA-13/17S launch  
 10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
 04/??/09 -- **Six-person crew on ISS**  
 04/15/09 -- **Constellation's Ares I-X Launch.**

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[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 11/02/07  
**Date:** Friday, November 02, 2007 2:12:39 PM  
**Attachments:**

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### **ISS On-Orbit Status 11/02/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 148 for Clayton Anderson. Flight Day 11 for STS-120/10A; Day 9 of Joint Ops.*

ISS/Shuttle crew wake-up: 1:08am EDT. Sleetime: 5:08pm (ISS), 5:38pm (Shuttle).

After crew wake-up, onboard activities moved briskly in continuation of preparations for tomorrow's EVA-4 (*see Note below*). *[EMU (Extravehicular Mobility Unit) suit and EVA tool configuration were completed, as well as almost all hazard assessments. The SSRMS (Space Station Remote Manipulator System) grappled and handed off the OBSS (Orbiter Boom Sensor System) extension arm to the SRMS (Shuttle RMS) for overnight parking, after completing the necessary MT (Mobile Transporter) translations from WS8 (Worksite 8) to WS3 and back.*

FE-2 Clay Anderson started his day with the IWIS (Internal Wireless Instrumentation System), first transferring the recorded data of the last IWIS structural dynamics data take (during P6 berthing) from the standard four RSUs (Remote Sensor Units) in Lab, Node, FGB & SM (Service Module) to the FS (File Server) laptop. The RSUs were then reset (programmed) for the next data take, later in the morning for Doug Wheelock's workout on the Shuttle ergometer at ~5:50am EDT. *[The second Lab RSU with accelerometer for recording the Shuttle exercise is currently located near the Orbiter's cycle ergometer on the middeck.]*

FE-1 Yuri Malenchenko had ~2.5 hrs scheduled for the periodic/long-term inspection of the pressure hull in the SM Working Compartment (RO), looking for any moisture, deposits, mold, corrosion and pitting behind panels 130, 134, 135, 138, 139 and underneath the TVIS treadmill.

Continuing the current round of the regular monthly preventive maintenance of RS (Russian Segment) ventilation systems, Yuri also spent time in the FGB cleaning

interior panel ventilation grilles.

Additionally, Malenchenko conducted the regular task (currently daily) of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- & FGB-to-Soyuz tunnels, the DC1-to-Progress and FGB-to-Node-1 passageway (this is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently ten persons).

CDR Whitson worked on the UOP-6 (Utility Outlet Panel 6) PS-120 Junction Box on reconfigurations for the LAN (Local Area Network) for Node-2 integration. *[Tasks included adding a mass storage cable (W-cable) to PS(Power Strip)-120, switching HRF (Human Research Facility) laptop power from HRF-1 to the W-cable, and configuring the ER5 (EXPRESS Rack 5) laptop with a PS-28 connection from the HRF-PC.]*

Continuing Node-2 outfitting for ~2.5 hrs, the CDR and Clay Anderson installed the cabling for the ISL (Integrated Station LAN) Router, to be strung and connected to the ISL later this month after Node-2 relocation to the Lab front end.

In Node-1/Unity, Peggy also inspected and cleaned the FDS (Fire Detection & Suppression) system's bacteria filter and SDs (smoke detectors). *[There are a total of two SD units in Node-1 (NOD1D3-1 & NOD1D3-03). Inspection included the Kapton tape at the rear of vacuum for damage or wear. If repair was necessary, photo documentation was required.]*

On the IATCS (Internal Active Thermal Control System in the Lab, the FE-2 disconnected the AmiA (Antimicrobial Applicator), relieved the pressure in its canister and stowed AmiA for return. Afterwards, Clayton removed low-flow jumpers from ITCS locations, performed a flush and took an OPA (Ortho-Phthalaldehyde) sample for return on the Shuttle. *[AmiA introduced OPA, an antimicrobial agent, into the Lab IATCS coolant fluid. An NH<sub>3</sub> (ammonia) sample was not required.]*

Yuri performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM. *[Regular daily SOZh maintenance consists, among else, of checking the ASU toilet facilities, replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers. Weekly SOZh reports (on Sundays) to TsUP/Moscow deal with number & dates of water and urine containers, counter readings of water consumption & urine collection, and total operating time of the POTOK air filtration system.]*

Clay later worked on the IMS (Inventory Management System), updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Malenchenko again had about 60 minutes for general crew orientation (station familiarization & acclimatization), as is standard daily rule for the first two weeks after starting station residency.

In preparation for tomorrow's EVA, the CDR set up two DCS-760 digital camera batteries for recharge in the Battery Charger in the Airlock (A/L).

At ~2:50am EDT, the FE-1 downlinked two PAO TV messages of greetings during VHF comm passes over RGS (Russian Ground Site) to TsUP/Moscow, one to a much-valued member of the Moscow Region Administration, the other to the Balashiha Military Prosecutor's Office on the 25<sup>th</sup> Anniversary of its formation.

ISS crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (FE-1, FE-2/full-time), RED resistive exerciser (CDR, FE-1) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Peggy transferred the crewmembers' exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

After completing A/L EL (Equipment Lock) configuration for the 4<sup>th</sup> spacewalk tomorrow and conducting several extensive reviews and teleconferences of EVA-4 timeline, procedures, hazard avoidance, etc. with all crewmembers and ground specialists, the two spacewalkers, Scott Parazynski (EV1) and Doug Wheelock (EV2), will begin their "campout" in the "Quest" A/L, starting mask prebreathe at ~3:53pm, then closing hatches and initiating depressurization of the CL (Crewlock) from 14.7 to 10.2 psi. Sleep for the ISS crew begins at 5:08pm, for the Shuttle crew at ~5:38pm.

**EVA-4 Overview:** Primary focus of Scott & Wheels' outside venture will be inspection and repair of the torn P6 Solar Array Wing (SAW). Afterwards, if certain criteria are satisfied (see below), EV1 & EV2 will get out of the way and monitor the deployment of the wing. Subsequent get-ahead tasks include retrieval of two APFRs (Articulating Portable Foot Restraints, #3 & #7) for inspection, if time available and room in Airlock, mating of a PDGF (Power & Data Grapple Fixture) "horseshoe" connector at Node-2, and installation of the Node 2 HR (hand rail) #371 that was deferred from EVA-2. After the regular overnight Campout by the

spacewalkers for denitrogenation/pre-breathe, egress is expected around 6:35am EDT tomorrow morning. EVA duration will again be about 6.5 hrs. *[Repair Concept: There are two damaged areas on the SAW 4B inboard blanket: a large rip from the hinge between array segments (“bays”) 35 & 36, and a small gap between bays 37 & 38. To stabilize the blanket in those areas, the affected bays will be “stitched” across the respective hinges (35/36 & 37/38) with five jerry-rigged wire clamps similar to dress shirt cufflinks, utilizing existing pin holes for inserting the cufflink anchors and requiring one-side access only. Because of the location of the pin holes, each of the “stitches” fortunately will run along spine-like rigidizing lines, called “stiffeners”. Criteria for going ahead with the subsequent deployment of the 4B Array Mast include:*

- *Snag on 4B right blanket eliminated;*
- *Array electrically safed by hinge wire being cut & end secured;*
- *Five stabilizers installed across hinge (priority from inboard to outboard);*
- *Guide wire cleared from creating additional hazards (grommet snag, FOD, free float); and*
- *Low tension mode during deployment visually confirmed and blanket stability monitored after each one-half bay deploy (i.e., stabilizers remaining in place, blanket deploying symmetrically, no additional snags, etc.).*

*Why 4B Panel Repair is required:*

- *Array is believed to be stable for the near term;*
- *However, it needs to be able to take loads over the long term;*
- *Right now, about 3 feet of the 15-ft long hinge are missing, which is designed to distribute a load of ~70 lbs across it, i.e. there is a load concentration;*
- *Therefore, the blanket could tear further over time;*
- *If the blanket tears too much, the array cannot be stabilized and would have to be jettisoned (loss of ~20 kW of power);*
- *Thus, P6 deployment is the number one priority for the rest of the mission.*

No CEO (Crew Earth Observations) target uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:38am EDT [= epoch]):

Mean altitude -- 342.2 km

Apogee height -- 344.5 km  
Perigee height -- 339.8 km  
Period -- 91.38 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0003515  
Solar Beta Angle -- -62.8 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.76  
Mean altitude loss in the last 24 hours -- 145 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 51259

**Significant Events Ahead** (*all dates Eastern, some changes possible. Also: Stage 10A is under reassessment*):

11/03/07 (FD11) -- EVA-4 (Parazynski/Wheelock) ~6:35am EDT  
11/04/07 -- **50-Year Anniversary of launch of female dog Laika, first living space passenger, into orbit**  
11/04/07 -- 2:00am: DST ends, ST begins  
11/05/07 -- STS-120/Discovery/10A undocking (FD14/5:32am)  
11/07/07 -- STS-120/Discovery/10A deorbit burn (FD16/10:44am EST)  
11/07/07 -- STS-120/Discovery/10A landing @ KSC (FD16/11:44am EST)  
TBD -- relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
TBD -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis undocking  
12/18/07 -- STS-122/Atlantis landing  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch.**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:** [Keeter, William H. \(HQ-LD070\)\[InDyne,](#)  
[Incl\];](#)  
**Subject:** ISS On-Orbit Status 11/01/07  
**Date:** Thursday, November 01, 2007 3:46:41 PM  
**Attachments:**

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### **ISS On-Orbit Status 11/01/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 147 for Clayton Anderson. Flight Day 10 for STS-120/10A; Day 8 of Joint Ops.*

ISS/Shuttle crew wake-up: 12:08am EDT. Sleptime: 4:38pm (ISS), 5:08pm (Shuttle).

***Mission Schedule Changes:*** EVA-4 for fixing the ripped P6 4B inboard blanket has been deferred one more day, to 11/3 (Saturday), to give crewmembers and ground teams more time for careful preparations. Also, the originally planned Shuttle deorbit & landing times on 11/7 have been shifted from ascending leg entries to descending leg entry opportunities. The latter not only significantly improve the crews' timeline and sleep shift but also provide daylight landing at KSC or EDW. The change in sleep cycles results in tonight's sleep time being delayed by 90 minutes (from the original 3:08pm to 4:38pm for ISS (5:08pm for STS); wakeup: 1:08am). Sleep time will be shifting later every day.

***SAW Repair:*** Most of the crew's activities today dealt with timeline reviews, gathering tools and preparing equipment for Saturday's EVA-4 spacewalk. Main focus today and tomorrow, besides readying EMUs and gloves, is on building jerry-rigged equipment for stabilizing the SAW (Solar Array Wing) hinge, by following uplinked plans and instructions developed overnight by MCC-H specialists. *[Being constructed, with onboard resources & available tools, are three sizes of Hinge Stabilizers:- two long, two medium & two short, using components from the Clamp & Bracket Kit and Large & Small Gauge Pin Kit. The Hinge Stabilizers/Spanners, essentially simple 12-gauge wire lengths fitted at each end with short aluminum strips, work similarly to tuxedo shirt cufflinks: each end will be fed through a hole in the SAW on opposite sides of the separated hinge. The Stabilizers even have a safety loop for an EVA tether, to reduce the risk of their floating away. After clearing the snagged guide wire, EV1 will clear the hinge pins and then install the*

*hinge stabilizer tools (spanners).]*

*Why is the 4B Panel Repair required?*

- The array is believed to be stable for the near term;
- However, the array needs to be able to take loads over the long term;
- Right now its 15-ft hinge, which should distribute a load of ~70 lbs, is missing about 3 feet, resulting in load concentration;
- Therefore, over time the blanket could tear further;
- If the blanket tears too much, the array cannot be stabilized and would have to be jettisoned (loss of ~20 kW of power);
- That makes P6 deployment the number one priority for the rest of the mission.

***EVA-4 Preparations:*** In addition, crewmembers in space and engineers on the ground, particularly also Canadian MSS (Mobile Service System) specialists, are tackling the second difficult problem of the spacewalk: how to get the spacewalkers to the site of the damage for the repair efforts. *[The plan is for the SSRMS (Space Station Remote Manipulator System), to grapple and handoff the OBSS (Orbiter Boom Sensor System) extension arm to the SRMS (Shuttle RMS) tomorrow for overnight parking, after having moved on the MT (Mobile Transporter) from WS8 (Worksite 8) to WS3 and back. On Saturday/EVA day, the SSRMS will regrapple the OBSS at its middle PDGF (Power & Data Grapple Fixture). EV1 (Parazynski) and EV2 (Wheelock) will install a PAD/WIF (Portable Foot Restraint Device/ Worksite Interface Fixture) adapter, WIF extender and APFR (Articulating PFR) on the OBSS, which then provides EV1 transportation & support for moving to and fixing the torn blanket bays. Wheels' main role is to support Scott and to provide/ relay GCA (ground control assist). Unpowered OBSS time will be minimized to preserve its science instrumentation equipment. A get-ahead task for EV2 will be the retrieval of an APFR which is suspect of having cut Wheels' glove and past EVA gloves, for IV inspection.]*

In the morning right after wakeup, Malenchenko terminated his second MBI-12 SONOKARD experiment session by taking the recording device from his SONOKARD sports shirt pocket. Later, Yuri copied the measurements to the RSE-MED laptop for subsequent downlink to the ground. *[SONOKARD objectives are stated to (1) study the feasibility of obtaining the maximum of data through computer processing of records obtained overnight, (2) systematically record the crewmember's physiological functions during sleep, (3) study the feasibility of obtaining real-time crew health data. Investigators believe that contactless acquisition of cardiorespiratory data over the night period could serve as a basis for developing efficient criteria for evaluating and predicting adaptive capability of human body in long-duration space flight.]*

Also before breakfast, CDR Whitson and FE-2-16 Tani collected their third saliva samples for the new INTEGRATED IMMUNE experiment payload. *[This experiment integrates studies of neuroendocrine & immune responses in humans during and after long-term stay at ISS to provide an understanding for the development of pharmacological tools to countermeasure unwanted immunological side effects during long-duration missions in space (Moon & Mars). Immune protocol requires the collection to occur first thing post-sleep, before eating, drinking and brushing teeth, and all samples are stored at ambient temperature.]*

The FE-1 serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The regen process will be terminated later tonight. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods. Filter bed 1 was regenerated on 10/30.]*

FE-2 Anderson worked on the newly installed AmiA (Antimicrobial Applicator), removing its insulation jackets to allow temperatures to equalize. *[After its installation a couple of days ago, flow through AmiA has been completed and the canister isolated. The AmiA introduces OPA (Ortho-Phthalaldehyde), an antimicrobial agent, into the Lab IATCS (Internal Thermal Control System) coolant.]*

Clay completed more outfitting tasks in Node-2, disconnecting a nitrogen (N<sub>2</sub>) line to the external Airlock hi-P tanks, closing all associated panels, taking documentary photographs of Node-2 closeout panels after the recent launch bolt removal, transferring stowage to Harmony for ZSR (Zero-G Stowage Rack) loading and then moved to Node-1 to install a Hatch Handle Guide Assembly on the starboard side.

CDR Whitson performed major IFM (In-flight Maintenance) on the Resistive Exercise Device (RED), replacing all canister pulley cables (done after every 53,515 cycles, based on life cycle testing results & safety controls), afterwards concluding with the standard Flexpac canister load calibration as required after cable replacements. (Last time done: 7/30/07). *[The on-orbit calibration of the Schwinn RED cans re-establishes the relationship of specific load settings with a specific number of pulls per setting, followed by recording of the load values measured with a calibration tool and steel handles from the on-orbit calibration kit.]*

As part of the regular monthly preventive maintenance of RS (Russian Segment) ventilation systems, Yuri spent time in the FGB (*Funktsionalnyi-Grusovoi Blok*), cleaning up and servicing the detachable VT7 fan screen guards (grilles) of the TCS/SOTR (Thermal Control System)'s gas-liquid heat exchangers (GZhT4) as well as replacing the PS1,2 dust collector filters.

Clay conducted the weekly 10-min. CWC audit as part of the continuing WDS (Water Delivery System) assessment of onboard water supplies. *[Updated “cue cards” based on the crew’s water calldowns are sent up every other week.]*

Anderson also took air samples for the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries are to be replaced if necessary. *[Purpose of the 10-min. activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements.]*

CDR-16 Whitson and FE-2 Anderson filled out the regular FFQ (Food Frequency Questionnaire), his 16<sup>th</sup>, her second, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

FE-1 Malenchenko conducted the regular task (currently daily) of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- & FGB-to-Soyuz tunnels, the DC1-to-Progress and FGB-to-Node-1 passageway (this is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently ten persons);

Yuri also performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM). *[Regular daily SOZh maintenance consists, among else, of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers. Weekly SOZh reports (on Sundays) to TsUP/Moscow deal with number & dates of water and urine containers, counter readings of water consumption & urine collection, and total operating time of the POTOK air filtration system.]*

Anderson worked on the IMS (Inventory Management System), updating/editing its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

ISS crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Clayton transferred the crew's exercise data file to the MEC for downlink.

No CEO (Crew Earth Observations) target uplinked for today.

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**ISS Orbit** (as of this morning, 8:44am EDT [= epoch]):

Mean altitude -- 342.3 km

Apogee height -- 344.2 km

Perigee height -- 340.4 km

Period -- 91.38 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0002809

Solar Beta Angle -- -63.6 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude **gain** in the last 24 hours -- 395 m (due to Shuttle)

Revolutions since FGB/Zarya launch (Nov. 98) -- 51244

**Significant Events Ahead** (*all dates Eastern, some changes possible. Also: Stage 10A being re-assessed!*):

11/03 (FD11) -- EVA-4 (Parazynski/Wheelock)

11/04/07 -- 2:00am: DST ends, ST begins

11/05/07 -- STS-120/Discovery/10A undocking (FD14/5:32am) **[changed]**

11/07/07 -- STS-120/Discovery/10A deorbit burn (FD16/10:44am EST **[changed]**)

11/07/07 -- STS-120/Discovery/10A landing @ KSC (FD16/11:44am EST)

**[changed]**

TBD -- relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

TBD -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis undocking

12/18/07 -- STS-122/Atlantis landing

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
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**CC:** [Keeter, William H. \(HQ-LD070\)\[InDyne, Inc\];](#) [Burroughs, Chris \(HQ-CI000\);](#) [Durkee, Richard W. \(HQ-LD070\)\[InDyne, Inc\];](#) [Smith, Lisa J. \(HQ-LD070\)\[InDyne, Inc\];](#)  
**Subject:** ISS On-Orbit Status 10/31/07  
**Date:** Wednesday, October 31, 2007 2:48:06 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/31/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 146 for Clayton Anderson. Flight Day 9 for STS-120/10A; Day 7 of Joint Ops.*

ISS/Shuttle crew wake-up: 12:38am EDT. Sleptime: 4:08pm (ISS), 4:38pm (Shuttle).

***Mission Schedule Change:*** The IMMT (ISS Mission Management Team) this morning deferred EVA-4 from tomorrow to Friday (11/2). Top priority on board & ground has been re-directed from inspecting the Stbd SARJ (Solar Alpha Rotary Joint) to fixing the ripped P6 4B Solar Array Wing (SAW) blanket as best as can be done, as long as the Discovery crews are on ISS. EVA-5 (Whitson/Malenchenko) may become a Stage EVA. Four special teams (Damage/root cause, EVA Assessment, Solar array constraints, Stage ops assessment) have been designated to study the situation and develop a new EVA-4 timeline for alleviating the current structurally unsound SAW condition. Stbd SARJ meanwhile remains in Directed (fixed) Position, out of Autotrack.

CDR Whitson assisted MS4 Paolo Nespoli in his first session with the ASI (Italian Space Agency) HPA (Hand Posture Analyzer) experiment by setting up the hardware and later tearing it down for stowage. *[HPA is used to study the crew's ability to use the upper limb in weightlessness. In zero-G, fatigue can have major effects on the hand and forearms of an astronaut. Thus, experiments based on the utilization of the upper limbs are assuming increasing significance in the framework of Human Physiology in space. By using different scientific protocols it will make it possible to determine the degradation in performance affecting the muscle-skeletal apparatus in weightlessness and help to facilitate studies on learning mechanisms for motor control. The results of such experiments can help to find methods of*

*countering fatigue, thus maintaining the condition and improving the performance of astronauts, which is of greater importance with proposed longer-term missions. Such methods can also be used on Earth for the treatment of subjects with local traumas, muscle atrophy, or diseases of the CNS (Central Nervous System). The HPA, which was used before by Ed Lu and Mike Foale on Increments 7 & 8, consists of two dynamometers (HGD-PFD/Handgrip & Pinch Force Dynamometers) for measuring handgrip and pinch forces, together with a gloved instrumentated device (PAG/Posture Acquisition Glove) worn by the astronaut, which allows for measurement of the bending angles on individual fingers. PAG is attached to an electronic box (WEB/Wrist Electronic Box), which houses an inertial tracking system made up of accelerometers and gyroscopes in order to determine the linear and angular motion, rotation and acceleration of the hand and forearm in all directions.]*

FE-1 Malenchenko spent about 90 minutes of major equipment servicing in the ASU toilet facility, changing out replaceable ASU parts with new components, viz., two receptacles (PR & MP), four hoses, a T-connector, an elbow fitting, an indicator, a filter insert (F-V), the pretreat container (E-K) with its hose. All old parts were discarded as trash. *[E-K contains five liters of pre-treat solution, i.e., a mix of H<sub>2</sub>SO<sub>4</sub> (sulfuric acid), CrO<sub>3</sub> (chromium oxide, for oxidation and purple color), and H<sub>2</sub>O (water). The pre-treat liquid is mixed with water in a dispenser (DKiV) and used for toilet flushing.]*

Besides ASU maintenance, the FE-1 also performed the routine servicing of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM). *[Regular daily SOZh maintenance consists, among else, of replacement of the KTO & KBO solid waste containers and replacement of EDV-SV waste water and EDV-U urine containers. Weekly SOZh reports (on Sundays) to TsUP/Moscow deal with number & dates of water and urine containers, counter readings of water consumption & urine collection, and total operating time of the POTOK air filtration system.]*

Later, Malenchenko took CWC (Contingency Water Container) #1064 to the Russian Segment (RS) for the periodic (about twice a month) replenishing of the Elektron oxygen generator's water supply for electrolysis, filling the KOV thermal loops' EDV container. Once filled, the EDV was connected to the BPK transfer pump for processing. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Peggy Whitson continued outfitting work in Node-2, installing ITCS (Internal Thermal Control System) sampling adapters and DDCU (DC-to-DC Converter Unit) protective covers on two racks, on the deck (NOD2D4) and overhead (NOD2O4).

Also in Node-2, FE-2-16 Dan Tani removed AVM (Anti-Vibration Mount) launch brackets from Harmony's CCAA (Common Cabin Air Assembly). *[The CCAAs, located in the Lab, Airlock and now also in Node-2, remove excess heat & excess moisture from the atmosphere. Depending on the module heat loads, the atmosphere flow-rate can range from 8,490 to 14,150 L/min (300 to 500 cfm). The CCAA/air conditioners are designed to be repairable by ORUs (Orbital Replacement Units).]*

Yuri Malenchenko conducted the regular task (currently daily) of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- & FGB-to-Soyuz tunnels, the DC1-to-Progress and FGB-to-Node-1 passageway (this is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently ten persons);

In the A/L, the CDR terminated the EVA-3 EMU battery recharge in the BSA (Battery Stowage Assembly). Also on her schedule was recharging four batteries for upcoming DCS760 digital cameras ops during EVA, while Clay was to take care of METOX (Metal Oxide) canister regeneration.

The two U.S. Flight Engineers, Anderson and Tani, joined for another 4 hrs of handover activities, used by Clay to familiarize his successor Dan with specific onboard tasks. In addition, there are "generic" handovers where crewmembers are joining to complete various designated standard tasks.

Yuri again had about 45 minutes for general station familiarization and acclimatization, as is standard daily rule for the first two weeks after starting station residency.

ISS crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-1), TVIS treadmill (CDR, FE-2), and RED resistive exercise device (CDR, FE-1, FE-2, FE-2-16).

Afterwards, Peggy transferred the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Shortly before sleep time, FE-1 Malenchenko set up the new Russian MBI-12 SONOKARD (Sonocard) payload and started his second experiment session, using a sports shirt from the SONOKARD kit with a special device in the pocket for testing a new method for acquiring physiological data without using direct contact on the

skin. Measurements are recorded on a data card for return to Earth. *[SONOKARD objectives are stated to (1) study the feasibility of obtaining the maximum of data through computer processing of records obtained overnight, (2) systematically record the crewmember's physiological functions during sleep, (3) study the feasibility of obtaining real-time crew health data. Investigators believe that contactless acquisition of cardiorespiratory data over the night period could serve as a basis for developing efficient criteria for evaluating and predicting adaptive capability of human body in long-duration space flight.]*

At ~5:05am EDT, Yuri supported a PAO TV interview with the State TV Broadcasting Company's "Kultura" Channel in Moscow, which observes its 10<sup>th</sup> Anniversary tomorrow (11/1). In that time, "Kultura" has aired many shows dedicated to space. *["When you are on the ground getting ready for your flight, do you watch TV Channel Kultura shows, and what appeals to you most of all in them?"; "Yuri, this is your fourth space flight. It is known that every minute of ISS residents is accounted for. Do you have any leisure time left under these conditions? If yes, how do you personally spend it?"]*

At ~7:48am, all ten station residents participated in a PAO TV joint crew news conference with U.S. media at NASA Centers, European media at the Esperia Mission Information Center at Hotel Aleph in Rome, Italy, and Russian news media at TsUP-Moscow.

Afterwards, both crews also joined for the traditional all-crew photo shoot.

*IV-CPDS Update:* Troubleshooting attempts by Peggy Whitson on the IV-CPDS (Intravehicular Charged Particle Directional Spectrometer) yesterday by reformatting its memory drive were not successful. The instrument is considered hard-failed and will be returned on a future flight. *[The IVCPDS was a secondary radiation detection measurement tool; the primary radiation measurement tool is the TEPC (Tissue Equivalent Proportional Counter).]*

No CEO (Crew Earth Observations) target uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:24am EDT [= epoch]):

Mean altitude -- 341.9 km  
Apogee height -- 343.7 km  
Perigee height -- 340.1 km  
Period -- 91.37 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0002712  
Solar Beta Angle -- -65.0 deg (magnitude decreasing, was highest ever!)  
Orbits per 24-hr. day -- 15.76  
Mean altitude gain in the last 24 hours -- 110 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 51228

**Significant Events Ahead** (*all dates Eastern, some changes possible. Also: Stage 10A being re-assessed!*):

11/02 (FD11) -- EVA-4 (Parazynski/Wheelock)  
11/04/07 -- 2:00am: DST ends, ST begins  
11/05/07 -- STS-120/Discovery/10A undocking (FD14/12:56am)  
11/07/07 -- STS-120/Discovery/10A deorbit burn (FD16/4:09am EST)  
11/07/07 -- STS-120/Discovery/10A landing @ KSC (FD16/5:11am EST)  
TBD -- relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
TBD -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis undocking  
12/18/07 -- STS-122/Atlantis landing  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch.**

Note: The daily ISS On-Orbit Status reports can also be found at  
[http://www.hq.nasa.gov/osf/iss\\_reports/index.htm](http://www.hq.nasa.gov/osf/iss_reports/index.htm)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:** [Keeter, William H. \(HQ-LD070\)\[InDyne, Inc\]; Burroughs, Chris \(HQ-CI000\); lisa.j.smith-1@nasa.gov; tsmith@mail.hq.nasa.gov;](#)  
**Subject:** ISS On-Orbit Status 10/30/07  
**Date:** Tuesday, October 30, 2007 2:59:14 PM  
**Attachments:** [image002.gif](#)

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### **ISS On-Orbit Status 10/30/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 145 for Clayton Anderson. Flight Day 8 for STS-120/10A; Day 6 of Joint Ops. [Mission Extension: see Note below.]*

ISS/Shuttle crew wake-up: 12:38am EDT. Sleptime: 4:08pm (ISS), 4:38pm (Shuttle).

**Truss segment P6 was successfully installed at the P5 element**, at the end of the port-side truss.

Also, all **P6 umbilicals were connected without issues**.

**P6 Solar Array Wing 2B was deployed by the crew nominally (~11:25am).**

Deployment of SAW 4B, consisting of two photovoltaic blankets, each made up of 31 individual segments ("bays"), was aborted at ~12:25pm when one of the bays showed a tear at its corner (not clear at this time whether this happened during deployment or retraction). *[See photo below.]*

**EVA-3 was completed fully successful**, accomplishing all objectives and lasting 7h 8m.

MS1 Scott Parazynski (EV1) & MS 3 Doug Wheelock (EV-2) –

- Attached P6 to P5 (with SSRMS);
- Connected P5-to-P6 umbilicals;
- Removed the SSU (Sequential Shunt Unit) shroud;
- Released P6 outboard Radiator cinch;
- Inspected portside SARJ (Solar Alpha Rotary Joint), [no shavings found];

- Transferred spare MBSU (Main Bus Switching Unit) with SRMS from Shuttle PLB to ESP-2 (External Storage Platform 2); and
- Reconfigured P1 & S1 SFUs (Squib Firing Units) after their use for the radiator deployments.

*[Official start time of the spacewalk was 4:45am EDT (~43 min ahead of schedule). It ended at 11:53am. Total EVA duration (PET = Phase Elapsed Time) was 7h 8m, bringing the EVA total for the first three 10A EVAs to 19h 55m. It was the 95<sup>th</sup> spacewalk for ISS assembly & maintenance and the 67<sup>th</sup> from the station (28 from Shuttle, 45 from Quest, 22 from Pirs) totaling 400h 33m. After today's EVA, a total of 111 spacewalkers (81 NASA astronauts, 20 Russians, and ten astronauts representing Japan-1, Canada-4, France-1, Germany-1 and Sweden-3) have logged a total of 587h 57m outside the station on building, outfitting and servicing. It also was the 117<sup>th</sup> spacewalk by U.S. astronauts.]*

Before breakfast, CDR Whitson and FE-2-16 Tani (camping out in the Airlock) collected their second saliva samples for the new INTEGRATED IMMUNE experiment payload. *[This experiment integrates studies of neuroendocrine & immune responses in humans during and after long-term stay at ISS to provide an understanding for the development of pharmacological tools to countermeasure unwanted immunological side effects during long-duration missions in space (Moon & Mars). Immune protocol requires the collection to occur first thing post-sleep, before eating, drinking and brushing teeth, and all samples are stored at ambient temperature.]*

FE-1 Yuri Malenchenko serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #1 of the regenerable dual-channel filtration system. The regen process will be terminated at ~3:05pm EDT. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

FE-2 Clay Anderson, CDR Peggy Whitson and Malenchenko continued with Node-2 outfitting. Clay and Yuri had ~70 min set aside for removing launch restraint bolts from closeout panels, while Peggy configured one (of two) Node-2 RSR (Resupply Stowage Rack) for on-orbit operations, installing a K-BAR (Knee-Brace Assembly Replacement) and restowing a "bad" K-BAR.

Afterwards, Anderson worked on the U.S. OGS (Oxygen Generation System) in the Lab, safing an SPS (Secondary Power System) cable connector with Kapton tape, to cover all metal parts.

Whitson performed troubleshooting on the failed IV-CPDS (Intravehicular Charged

Particle Directional Spectrometer), reformatting its memory drive and loading an executable file from the MEC (Medical Equipment Computer) to verify proper functioning after the reformatting. *[The IV-CPDS memory drive was found to be corrupted during the first part of troubleshooting on 10/1. The IV-CPDS is used for taking background radiation readings in the cabin. ]*

Malenchenko conducted the first recharge of the Motorola Iridium-9505A satellite phone brought up on Soyuz 15S, a monthly routine job. The FE-1 took care of the recharge, completing the process and cleaning up at about 10:55am EDT. *[After retrieving it from its location in the Soyuz TMA-11/15S descent module (BO), Yuri initiated the recharging of its lithium-ion battery, monitoring the process every 10-15 minutes as it took place. Upon completion, the phone was returned inside its SSSP Iridium kit and stowed it back in the BO's operational data files (ODF) container. The satphone accompanies returning ISS crews on Soyuz reentry & landing for contingency communications with SAR (Search-and-Rescue) personnel after touchdown (e.g., after an "undershoot" ballistic reentry). The Russian-developed procedure for the monthly recharging has been approved jointly by safety officials. During the procedure, the phone is left in its fire-protective fluoroplastic bag with open flap.]*

In the course of his day, Yuri also –

- Conducted the regular task (currently daily) of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- & FGB-to-Soyuz tunnels, the DC1-to-Progress and FGB-to-Node-1 passageway (this is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently ten persons);
- Terminated BSA (Battery Stowage Assembly) recharge of EVA-2 EMU batteries from EVA-2;
- Performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables,
- Performed the periodic (generally monthly) service of the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), by removing the PCMCIA memory card #939 from the AST spectrometer's slot and replacing it with card #936 to continue AST ops,
- Conducted his second run of the Russian "Diatomeya" ocean observations program, using the HDV (High Definition Video) camcorder to obtain imagery of bio-luminescent glow of high-production zones in the Indian Ocean (possibly visible as light greenish spots of low intensity), and
- Supported reactivation of the Elektron O<sub>2</sub> generator at 32 amps by monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating.

*[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Peggy Whitson, assisted by Dan Tani, performed the periodic offloading of the Lab CCAA (Common Cabin Air Assembly) dehumidifier's condensate tank, filling a CWC (Contingency Water Container, #1062) with the collected water slated for processing. *[Estimated offload time before termination (leaving ~5.25 kg in the tank): ~30 min.]*

Malenchenko again had about 50 minutes for general station familiarization and acclimatization, as is standard daily rule for the first two weeks after starting station residency.

The two U.S. Flight Engineers, Anderson and Tani, joined for a period of handover activities, used by Clay to familiarize his successor Dan with specific onboard tasks.

CDR Whitson again assisted the spacewalkers when they returned at ~11:53am, handling CL repress, joint A/L post-EVA ops, and setting up a DCS 760 camera for EMU glove inspection.

Later, Dan Tani reconfigured the cameras for photographing the SAW deployment.

Clay performed the regular EVA photo downlink to MCC-H, initiated the recharge of the EVA-3 EMU batteries in the "Quest" BSA, and started METOX (Metal Oxide) canister regeneration in the A/L.

ISS crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2, FE-2-16), RED resistive exercise device (FE-1, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Yuri transferred the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*10A Mission Extension:* Mission 10A has been extended by one day to accommodate a rest day (Friday) inserted between EVA-4 and EVA-5. EVA-4, originally planned for 4h 45m, will be extended to full duration (6.5 hrs) to dedicate 100% of the spacewalk to more detailed attention to the Stbd SARJ issue. An R&R repair of a SARJ TBA (Trundle Bearing Assembly) or DLA (Drive Lock Assembly) is currently not planned. The T-RAD (Tile Repair Ablator Dispenser) demonstration in

the Shuttle PLB originally scheduled for EVA-4 will be deferred to a later date. EVA-5 timeline remains unchanged from pre-mission plan.

*Background info on SARJ:* Each of the two SARJs enables the solar arrays to always point to the sun by rotating like a Ferris wheel. The port SARJ on P3/P4 provides tracking for the P4 & P6 solar arrays; the starboard SARJ provides tracking for the S4 & S6 solar arrays (S6 to be delivered on 15A). The SARJ can rotate 360 degrees clockwise and counterclockwise. SARJ also provides the structural interface between the P3 or S3 and P4 or S4 elements. It includes hardware to route power & data through the rotating SARJ interface to the outboard truss segment. The SARJ includes an inboard and an outboard race ring, which provide the structural connection between the P3 & P4 elements. Along the circumference of each race ring are gear teeth that mesh with the DLA (Drive Lock Assembly) pinion gear to rotate the SARJ. The outboard race ring is used by the DLA for rotating the SARJ. SARJ inboard & outboard race rings are held together by 12 equally-spaced trundle bearings. Each trundle bearing is fixed to the inboard race ring and is clamped onto the outboard race ring with a roller interface to allow for SARJ rotation. There are three rollers on each trundle bearing that interface with the outboard race ring, - an inner and outer upper roller and a center roller. Each roller consists of two bearings: the primary and journal bearings. The primary bearing rotates. If the primary bearing seizes up, the journal bearings will begin rotating. The journal bearing is designed to operate for about 30 days. There are micro switches in the trundle bearing that allow the ground to know if the journal bearing is rotating.

No CEO (Crew Earth Observations) target uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:01am EDT [= epoch]):

Mean altitude -- 342.0 km

Apogee height -- 343.8 km

Perigee height -- 340.3 km

Period -- 91.38 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0002646

Solar Beta Angle -- -65.3 deg (magnitude peaking, highest ever!)

Orbits per 24-hr. day -- 15.76

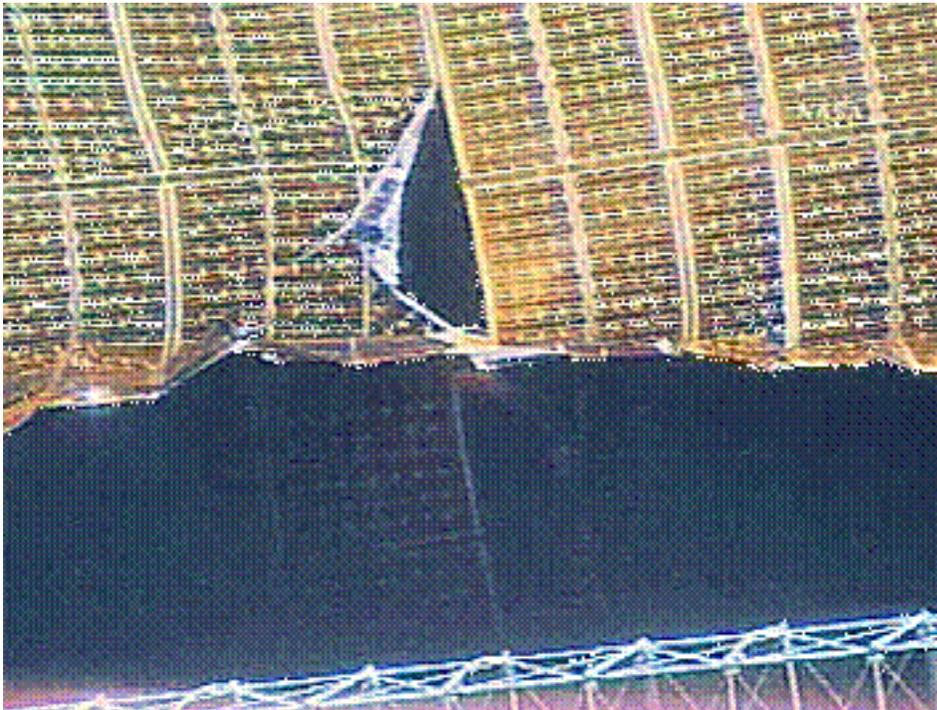
Mean altitude gain in the last 24 hours -- 10 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51212

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

- 11/01 (FD10) -- EVA-4 (Parazynski/Wheelock)
  - 11/03 (FD12) -- EVA-5 (3:58am-10:38am; Whitson/Malenchenko)
- 11/04/07 -- 2:00am: DST ends, ST begins
- 11/05/07 -- STS-120/Discovery/10A undocking (FD14/12:56am)
- 11/07/07 -- STS-120/Discovery/10A deorbit burn (FD16/4:09am EST)
- 11/07/07 -- STS-120/Discovery/10A landing @ KSC (FD16/5:11am EST)
- 11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)
- 11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab
- 11/14/07 -- US EVA-10
- 11/18/07 -- US EVA-11
- 12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)
- 12/08/07 -- STS-122/Atlantis/1E docking
- 12/15/07 -- STS-122/Atlantis undocking
- 12/18/07 -- STS-122/Atlantis landing
- 12/22/07 -- Progress M-61/26P undocking (DC1) & reentry
- 12/23/07 -- Progress M-62/27P launch
- 12/25/07 -- Progress M-62/27P docking (DC1)
- 01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)
- 01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**
- 02/06/08 -- Progress M-62/27P undocking
- 02/07/08 -- Progress M-63/28P launch
- 02/09/08 -- Progress M-63/28P docking
- 02/14/08 -- ATV-1 docking (SM aft port)
- 02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)
- 02/16/08 -- STS-123/Endeavour/1J/A docking
- 02/27/08 -- STS-123/Endeavour undocking
- 02/29/08 -- STS-123/Endeavour landing
- 04/08/08 -- Soyuz TMA-12/16S launch
- 04/10/08 -- Soyuz TMA-12/16S docking (DC1)
- 04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)
- 04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)
- 04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.
- 04/26/08 -- STS-124/Discovery/1J docking
- 05/02/08 -- STS-124/Discovery/1J undocking
- 05/14/08 -- Progress M-64/29P launch
- 05/16/08 -- Progress M-64/29P docking (DC1)

07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
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08/14/08 -- Progress M-65/30P docking (SM aft port)  
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09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**



*Solar Array Wing 4B damaged --- 10/30/07*

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 10/29/07  
**Date:** Monday, October 29, 2007 3:23:18 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/29/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 144 for Clayton Anderson. Flight Day 7 for STS-120/10A; Day 5 of Joint Ops. Underway: Week 2 of Increment 16.*

ISS/Shuttle crew wake-up: 12:38am EDT. Sleptime: 4:08pm (ISS), 4:38pm (Shuttle).

Today's four major assembly activities were completed successfully and on time:

- **Heat rejection Radiators (PVRs) #1/outboard & #3/inboard on the S1 segment were unfolded** (12:52am-1:52am) during crew sleptime (but observed by crewmembers);
- **P6 truss segment, with retracted solar arrays, was handed off to the SRMS** (Shuttle Remote Maneuvering System) from the SSRMS (Space Station RMS), after overnight "parking";
- **Mobile Transporter (MT), with the SSRMS based on it, has rolled on its rails to Worksite 8** (WS-8) on the station's port side;
- **P6 truss handed back to & grappled by the SSRMS** for overnight parking until tomorrow's installation on the P5 truss.

*[Crewmembers on the SSRMS & SRMS controls were Zamka, Wilson, Anderson & Tani.]*

After breakfast, FE-2 Anderson worked with the DCS 760 EVA cameras, deconfiguring them and using specific items from them for preparing DCS 760 camera #1038, equipped with 28-mm lens, for tomorrow's EVA-3, leaving it

connected for battery charging.

In support of upcoming payload data transferring from the BSPN payload server for subsequent downlink on OCA comm (via the Russian RSS1 laptop to a PCMCIA flash card), FE-1 Malenchenko performed the periodic time synchronization between the RSS1 and the BSPN, after testing functionality by checking data comm between the two computers and synching RSS1 to station time. *[Before RSS1/ BSPN synchronization, the RSS1 is updated with the exact time as per the station clock (which in turn is synchronized daily from RGS/Russian Ground Site). Experiment control application is a payload file transfer program called ShellForKE.]*

As a major activity on their timelines, CDR Whitson and FE-2-16 Tani today worked in Node-2, outfitting Harmony's four Avionics Racks for on-orbit operations. *[Configuring the AV racks (NOD2D4, NOD2S4, NOD2O4, NOD2P4) in Bay 4 involved disengaging launch restraints, installing left & right pivot fittings for rack rotation (away from wall), K-Bars, and DDCU (DC-to-DC Converter Unit/N2P3A) Parallel Connector, removing Knee Braces for each rack, rack rotation to upright, and closing out.]*

Malenchenko performed monthly maintenance on the Russian IK0501 GA (gas analyzer) of the SOGS Pressure Control & Atmospheric Monitoring System, deactivating the unit and replacing its CO<sub>2</sub> filter assembly (BF) with a new unit from FGB stowage (replaced last: 9/18). *[After ensuring good seals on the instrument's base and no leaks around the installed filter, Yuri reactivated the GA and stowed the spent BF for disposal. IK0501 is an automated system for measuring CO<sub>2</sub>, O<sub>2</sub>, and H<sub>2</sub>O in the air as well as the flow rate of the gas being analyzed.]*

In the course of his busy day, Yuri also –

- Conducted the regular task (currently daily) of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- & FGB-to-Soyuz tunnels, the DC1-to-Progress and FGB-to-Node-1 passageway (this is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently ten persons);
- Completed another radiation data monitoring & logging session for flow & dose power data with the Matryoshka-R radiation payload and its LULIN-5 electronics box (accumulated readings were recorded on a log sheet for subsequent downlink to TsUP/Moscow via the BSR-TM payload data channel);
- Terminated the nitrogen (N<sub>2</sub>) gas transfer from Discovery to the ISS high-pressure storage tanks (at least 28 lbs of N<sub>2</sub> have been transferred as of last evening), and

- Performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables.

Clay Anderson worked on the IWIS (Internal Wireless Instrumentation System), reprogramming its RSUs (Remote Sensor Units) for the next data take. *[IWIS has RSUs in the Lab and Node-1 plus the NCU (Network Control Unit) in the Lab, all power-connected to UOPs (Utility Outlet Panels) instead of running on batteries.]*

Peggy Whitson performed the periodic check of active U.S. payloads, i.e., cleaning the ANITA (Analyzing Interferometer for Ambient Air) inlet plus inspecting and filter cleaning of the CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to Earth.]*

FE-1 Malenchenko and FE-2-16 Tani again had about 60 minutes each for general station familiarization and acclimatization, as is standard daily rule for the first two weeks after starting station residency.

ISS crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1. FE-2/full time), and RED resistive exercise device (FE-1).

Yuri transferred the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:23am EDT, Paolo Nespoli conducted a ham radio exchange with students at IIS Deambrosis-Natta in Sestri Levante & the Engineering Faculty of the University of L'Aquila in L'Aquila, Italy. Questions to the crew were uplinked by ARISS (Amateur Radio on ISS) beforehand. *["Perché hai deciso di intraprendere questo viaggio?"; "Quale è l'emozione più forte che si prova nel primo volo spaziale?"; "Dalla ISS è possibile riconoscere ad occhio nudo la catena montuosa del Gran Sasso?"; "E' più una passione o un lavoro?"; "Ogni quanti giorni bisogna correggere l'orbita della ISS?"]*

At ~1:45pm EDT, all crewmembers, except for Parazynski, Wheelock, Zamka & Nespoli (all being already busy with EVA-3 preps), supported another PAO TV event with three news media from the new "Harmony" module,- ABC News (Gina Sunseri), NBC News (Tom Costello), and CNN (T.J. Holmes).

In preparation for tomorrow's EVA-3 by Scott Parazynski & Doug Wheelock, Scott worked in the Airlock (A/L), preparing their EMU/spacesuits and the A/L EL (Equipment Lock), swapping EMU batteries, replacing METOX (Metal Oxide) canisters and checking out the REBA powered suit equipment and tools.

After completing A/L EL configuration for the third spacewalk tomorrow and conducting a joint one-hour review of EVA-3 timeline & procedures with all crewmembers at ~12:40pm, the two spacewalkers, Parazynski (EV1) and Wheelock (EV2), began their "campout" in the "Quest" A/L, starting mask prebreathe at ~2:53pm, then closing hatches and initiating depressurization of the CL (Crewlock) from 14.7 to 10.2 psi. Sleep for the ISS crew begins at 4:08pm, for the Shuttle crew at ~4:38pm.

EVA-3 begins tomorrow (Tuesday) at ~5:28am EDT and lasts an estimated 7h, nominally ending at 12:28pm. Paolo Nespoli and Peggy Whitson will again be IV-1 and IVA-2 (Intravehicular) crewmembers, assisting particularly with the Campout.

[Main objectives of EVA-2 are:

- *Attach P6 to P5 (with SSRMS);*
- *Connect P5 to P6;*
- *Remove SSU (Sequential Shunt Unit) Shroud;*
- *Release P6 outboard Radiator Cinches;*
- *Inspect portside SARJ (Solar Alpha Rotary Joint), [late timeline change];*
- *Transfer spare MBSU (Main Bus Switching Unit) with SRMS from Shuttle PLB to ESP-2 (External Storage Platform 2); and*
- *Reconfigure P1 & S1 SFUs (Squib Firing Units) after their use for the radiator deployments.]*

*Stbd SARJ Inspection Update:* Because of yesterday's discovery of metal shavings sticking to the Stbd SARJ's race-ring, brackets and other areas under the #2 thermal cover (of 22 total), the IMMT (ISS Mission Management Team) has decided to modify tomorrow's EVA-3 timeline by adding an inspection of the identical SARJ on the opposite port side. Subsequent steps will depend on the findings of the ongoing investigation, up to and including possible R&R of the trundle bearing with an onboard spare, if required. New insight is also expected by the analysis of the "shaving" samples collected by EV3 Tani, after their return on STS-120.

*Quick-Look of tomorrow's (FD8) Events (EDT):*

- 12:38am: Both crews wake
- 01:13am: EVA-3 preps resume
- 03:08am: SSRMS moves P6 truss to P5 pre-install position
- 05:28am: EVA-3 begin
- 06:03am: P5 installation on P6 & umbilicals mating begin

- 10:33am: P6 Thermal Radiator deploy
- 11:58am: P6 2B SAW (Solar Array Wing) redeploy begins
- 12:38pm: EVA-3 ends
- 01:28pm: P6 4B SAW redeploy begins
- 04:08pm: ISS Crew sleep
- 04:38pm: Shuttle Crew sleep
- 12:38am: Both crews wake up for FD9.

No CEO (Crew Earth Observations) target uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:58am EDT [= epoch]):

Mean altitude -- 342.1 km

Apogee height -- 343.9 km

Perigee height -- 340.2 km

Period -- 91.37 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.00027

Solar Beta Angle -- -64.5 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude gain in the last 24 hours -- 170 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51197

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

- 10/30 (FD8) -- EVA-3 (5:28am-12:38pm; Parazynski/Wheelock)
- 10/30 (FD8) -- P6 install on P5 truss (~6:03am)
- 11/01 (FD10) -- EVA-4 (4:28am-9:13am; Parazynski/Wheelock)
- 11/02 (FD11) -- EVA-5 (3:58am-10:38am; Whitson/Malenchenko)

11/04/07 -- STS-120/Discovery/10A undocking (FD13/1:34am)

11/04/07 -- 2:00am: DST ends, ST begins

11/06/07 -- STS-120/Discovery/10A deorbit burn 3:47am EST

11/06/07 -- STS-120/Discovery/10A landing @ KSC (FD15/4:48am EST)

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis undocking  
12/18/07 -- STS-122/Atlantis landing  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 10/28/07  
**Date:** Sunday, October 28, 2007 2:30:48 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/28/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday - Day 143 for Clayton Anderson. Flight Day 6 for STS-120/10A; Day 4 of Joint Ops.*

ISS/Shuttle crew wake-up: 1:08am EDT. Sleptime: 4:08pm (ISS), 4:38pm (Shuttle).

The **P6 truss segment was successfully detached** from the Z1 truss element. It is now "parked" for overnight on the end of the SSRMS (Space Station Remote Maneuvering System). *[The detaching, by Steph Wilson & Doug Wheelock at Canadarm2's controls, took place at ~6:55am EDT. P6 will be installed at the far end of the P5 truss by the SSRMS on Tuesday (10/30), after having been temporarily handed off to the SRMS (Shuttle RMS) tomorrow to allow the SSRMS to change its base, moving on the MT (Mobile Transporter) an outboard work site (WS-8).]*

**EVA-2 went very well**, lasting 6h 33m. Shuttle/MS1 Scott Parazynski (EV1) & FE-2-16 Dan Tani (EV-3) –

- *Disconnected Z1-to-P6 fluid umbilical QDs (Quick Disconnects);*
- *Detached the P6 truss from Z1 truss element for its removal by SSRMS;*
- *Outfitted Node-2 (handrails, trunnion/keel pin, covers, gap spanners, caps, CBM restraints, WIFs);*
- *Inspected the CETA (Crew & Equipment Translation Aid) S1 handrail for two suspected MMOD (micrometeoroid/orbital debris) hits;*
- *Inspected the Stbd SARJ (Solar Alpha Rotary Joint), finding metal shavings (see Note below) ;*
- *Configured the SFU (Squib Firing Unit) on the S1 truss to "launch" condition for radiator deployment tomorrow;*
- *Reconnected MBSU (Main Bus Switching Unit) jumpers to support P6*

- startup on P5; and*
- *Structurally installed PDGF (Power & Data Grapple Fixture) on Node-2.*

Tasks deferred for a subsequent spacewalk are:

- Completion of Node-2 PDGF installation by connecting power/data cables (however, PDGF is ready to support Node 2 relocation),
- Installation of one Node-2 handrail, and
- RPCM S04B-C R&R (Remote Power Controller Module Removal & Replacement).

*[Official start time of the spacewalk was 5:32am EDT (~26 min ahead of schedule). It ended at 12:05pm. Total EVA duration (PET = Phase Elapsed Time) was 6h 33m. It was the 94<sup>th</sup> spacewalk for ISS assembly & maintenance and the 66<sup>th</sup> from the station (28 from Shuttle, 44 from Quest, 22 from Pirs) totaling 393h 25m. After today's EVA, a total of 109 spacewalkers (79 NASA astronauts, 20 Russians, and ten astronauts representing Japan-1, Canada-4, France-1, Germany-1 and Sweden-3) have logged a total of 580h 49m outside the station on building, outfitting and servicing. It also was the 116<sup>th</sup> spacewalk by U.S. astronauts.]*

Before breakfast, CDR Whitson and FE-2-16 Tani (camping out in the Airlock) collected their first saliva samples for the new INTEGRATED IMMUNE experiment payload. *[This experiment integrates studies of neuroendocrine & immune responses in humans during and after long-term stay at ISS to provide an understanding for the development of pharmacological tools to countermeasure unwanted immunological side effects during long-duration missions in space (Moon & Mars). Immune protocol requires the collection to occur first thing post-sleep, before eating, drinking and brushing teeth, and all samples are stored at ambient temperature.]*

After the 8-hr sleep period before the spacewalk, the Airlock Crewlock (A/L CL) hatch was cracked at ~1:43am EDT for a hygiene break/with mask prebreathe for Parazynski and Tani, after spending the night on 10.2 psi campout. Around 2:30am, the hatch was closed again by IV-2 Peggy Whitson for EVA preparations in 10.2 psi, followed by EMU purge & prebreathe. Afterwards, Whitson supported CL depressurization and EV1/EV3 egress (5:32am).

Before spacewalk begin, FE-1 Malenchenko verified powerdown of onboard ham radio equipment (Kenwood in SM & Ericsson in FGB) to prevent RF interference with the EMUs.

Yuri also conducted the (currently) daily job of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- and FGB-to-Soyuz tunnels,

and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently ten persons.]*

Clay Anderson ran a check on the new EWIS NCU (External Wireless Instrumentation System/Network Control Unit).

Afterwards, the FE-2 worked in Node-1 & Node-2, installing hatch cover guide rings at Unity's port hatch and Harmony's aft hatch.

Also in Node-2, Clayton set up the CBCS (Centerline Berthing Camera System), to support the upcoming berthing of the PMA-2 (Pressurized Mating Adapter 2) prior to the transfer of the Node/PMA "stack" to the front end of the Lab module.

While the spacewalk went on, the FE-2 prepared DCS-760 digital still cameras for taking photographs of the spacewalker's EMU gloves after ingress, to be downlinked for damage inspection. *[After EVA-1, inspection of downlinked glove photographs from Doug Wheelock's right-hand glove showed excessive wear of the RTV (Room Temperature Vulcanizing) material. For EVA-3, Wheelock will replace one or both of his gloves with backups.]*

CDR Whitson, assisted by Yuri as required, meanwhile unbolted and removed the no-longer-needed NPRV (Negative Pressure Relief Valve) from the "Harmony" Node's port aft IMV (Intermodular Ventilation) flange on the bulkhead and installed the IMV valve instead.

Afterwards, Yuri and Clay installed the Node-2 internal hatch door window.

The FE-1 performed the routine task of taking two photos of the internal part of the FGB nadir port's docking cone, used for the recent Soyuz TMA-11/15S docking. These images are used to refine current understanding of docking conditions. The pictures were then transferred to OCA for subsequent downlinking. *[The objective is to take photo imagery of the scratch or scuff mark left by the head of the docking probe on the internal surface of the drogue (docking cone) ring, now rotated out of the passageway. As other crewmembers before him, the FE-1 used the Nikon D1X digital still camera to take two pictures each with the hatch closed down.]*

Early in the day, Malenchenko took the general U.S. medical PFE (Periodic Fitness Evaluation), assisted by Peggy Whitson as CMO (Crew Medical Officer) for taking BP (blood pressure) readings, a 90-min procedure to check up on general crewmember health. The PFE was also performed yesterday on the two spacewalkers as regular pre-EVA checkup. *[The cardiovascular readings were logged by Peggy on the MEC IFEP (Medical Equipment Computer/In-Flight*

*Examination Program).]*

Yuri conducted the routine maintenance of the SOZh (ECLSS/Environment Control & Life Support System) system in the SM, including ASU toilet facilities systems/replaceables plus the weekly collection of toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Malenchenko also gathered weekly data on total operating time and activity durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's Air Revitalization Subsystem (SOGS) for reporting to TsUP.

Later, the FE-1 worked on the IMS (Inventory Management System), updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Peggy Whitson again assisted the spacewalkers when they returned, handling CL repress, joint A/L post-EVA ops, and later starting the downlink of EVA imagery.

ISS crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-2/full time), RED resistive exercise device (CDR), and VELO bike with bungee cord load trainer (FE-1).

Clayton copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week). *[Polar HRM developed a failure in its transmitter during the last few days. After some of her heart rate data were lost, CDR Whitson switched to a new spare, restoring the HRM.]*

*Stbd SARJ Inspection Update:* During EVA-2, EV3 Tani removed thermal cover #12 on the starboard SARJ (Solar Alpha Rotary Joint), after an external 360-deg MLI (Multilayer Insulation) inspection did not find anything unusual. Underneath the cover Dan reported seeing magnetized metal filings or shavings sticking to the race-ring, brackets and other areas. In Tani's words, the race-ring looks "corroded". From the wireless video it looks like the race-ring has been damaged by sliding metal on metal contact over the bearing surface. EV3 was able to take a sample of the shavings after getting some sticky "flycatcher" tape from the A/L. Still pictures were not taken of the damage due to problems with two DCS cameras.

Helmet cam video was obtained however. For now, where possible the Stbd SARJ will be parked instead of Autotracking to reduce wear on the inboard race-ring. The SARJ will be positioned to protect the solar arrays during dynamic events (e.g., thruster firings).

*PGSC Update:* After replacement of all cables with Shuttle spares and some excess ISS PGCS equipment, the Shuttle PGSC computer network is working nominally.

*Quick-Look of tomorrow's (FD7) Events (EDT):*

- 12:38am: Both crews wake
- 12:53am: S1 ETCS (External Thermal Control System) Radiator #1 deploy
- 01:23am: S1 ETCS (External Thermal Control System) Radiator #3 deploy
- 03:08am: SSRMS hands off P6 truss to SRMS
- 05:23am: SSRMS moves on MT/MBS from WS-4 to WS-8
- 09:08am: P6 handed off from SRMS back to SSRMS (install on P5 on FD8)
- 09:43am: Node-2 Avionics Rack preparations
- 02:53pm: Parazynski/Wheelock Campout begins for EVA-3
- 04:08pm: ISS Crew sleep
- 04:38pm: Shuttle Crew sleep
- 12:38am: Both crews wake for FD8.

No CEO (Crew Earth Observations) target uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

- 10/30 (FD8) -- EVA-3 (5:28am-12:38pm; Parazynski/Wheelock)
  - 10/30 (FD8) -- P6 install on P5 truss (~6:03am)
  - 11/01 (FD10) -- EVA-4 (4:28am-9:13am; Parazynski/Wheelock)
  - 11/02 (FD11) -- EVA-5 (3:58am-10:38am; Whitson/Malenchenko)
- 11/04/07 -- STS-120/Discovery/10A undocking (FD13/1:34am)  
11/04/07 -- 2:00am: DST ends, ST begins  
11/06/07 -- STS-120/Discovery/10A deorbit burn 3:47am EST  
11/06/07 -- STS-120/Discovery/10A landing @ KSC (FD15/4:48am EST)  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)  
12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis undocking  
12/18/07 -- STS-122/Atlantis landing  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/27/07  
**Date:** Saturday, October 27, 2007 5:16:15 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/27/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- Day 142 for Clayton Anderson. Flight Day 5 for STS-120; Day 3 of Joint Ops.*

*Flight Control to ISS/Shuttle crews: "Yesterday was such a super successful day!!! Who would have predicted that Node-2 would be attached to station, right on schedule, just as planned!!! It is a wonderful feeling when a plan comes together like it did yesterday!!!! Too bad you could not hear the cheering that went on down here when Node-2 was secured to Node-1!"*

ISS crew wake-up: 2:08am EDT; sleeptime: 4:38pm.  
Discovery crew wake-up: 1:38am; sleeptime: 5:08pm.

**Crew ingress into Node-2 "Harmony" took place at 8:24am EDT**, adding over 2500 cu.ft. (71 cubic meter) of living and working space to the ISS. *[After CDR Peggy Whitson and MS4 Paolo Nespoli opened the hatches and floated into the new module, crewmembers followed and held a christening ceremony, acknowledging the six schools and students who submitted the name "Harmony". Harmony will provide the docking ports for new research laboratories from ESA (European Space Agency) and JAXA (Japan Aerospace Exploration Agency).]*

Early after her wakeup, CDR Whitson completed the important SODF (Station Operations Data File) Emergency Book deployment (had to be done prior to Node-2 ingress). *[The deployment involved the 10A EMER 1 & 2 books, plus updating the Warning book.]*

Prior to ingressing Node-2, Whitson & Nespoli collected tools for configuring the "vestibule" space between the Node-1 and Node-2 hatches, performing its outfitting necessary for the ingress (i.e., to provide power & data interfaces between the modules).

Also before entering "Harmony", FE-1 Malenchenko set up the Russian AK-1M adsorber and IPD-CO (carbon monoxide) Draeger tube air sampling equipment. Immediately after ingress, Yuri performed the air sampling, joined by Peggy and Paolo, who collected air samples with the CSA-CP (Compound Specific Analyzer-Combustion Products) and GSC (Grab Sample Container) equipment. *[For the first 2.5 hrs after initiation of air ventilation (via a newly installed ventilation duct) between Node-1 and Node-2, crewmembers wore PPE (Personal Protective Equipment) surgical masks and goggles. For the PAO event from "Harmony" later in the afternoon, the air inside Node-2 had to be renewed about five times.]*

While ingress preparations went on, FE-1 Yuri Malenchenko conducted a run with the Russian MBI-21 PNEVMOKARD experiment, his first on-orbit session (which forbids moving or talking during data recording). The experiment is controlled from the RSE-Med A31p laptop, equipped with new software, and uses the TENZOPLUS sphygmomanometer to measure arterial blood pressure. *[PNEVMOKARD (Pneumocard) is an attempt to obtain new scientific information to refine the understanding about the mechanisms used by the cardiorespiratory system and the whole body organism to spaceflight conditions. By recording (on PCMCIA cards) the crewmember's electrocardiogram, impedance cardiogram, low-frequency phonocardiogram (seismocardiogram), pneumotachogram (using nose temperature sensors), and finger photoplethysmogram, the experiment supports integrated studies of (1) the cardiovascular system and its adaptation mechanisms in various phases of a long-duration mission, (2) the synchronization of heart activity and breathing factors, as well as the cardiorespiratory system control processes based on the variability rate of physiological parameters, and (3) the interconnection between the cardiorespiratory system during a long-duration mission and the tolerance of orthostatic & physical activities at the beginning of readaptation for predicting possible reactions of the crewmembers organism during their return to ground.]*

Afterwards, the FE-1 completed the periodic collection and logging of accumulated data of the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the RBO MATRYOSHKA-R payload in the DC1 Docking Compartment. *[The reader automatically records radiation readings at strictly defined times (:00, :15, :30, :45 minutes). The complex Matryoshka payload suite is designed for sophisticated radiation studies. The payload collects radiation measurements every 15 minutes of each hour around the clock.]*

Yuri also conducted his first run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Sony DSR PD-150P camcorder to obtain imagery of color contrasting blooms in oceanic waters as well as optical and morphologic cloud cover non-uniformities along the flight path from SM windows #7 & #8. *[Photo targets were the Atlantic Ocean along the track*

*from offshore Brazil to the Bay of Biscay.]*

Later, Malenchenko performed the (currently) daily job of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- and FGB-to-Soyuz tunnels, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently ten persons.]*

CDR Whitson returned the temporarily removed stowage bags to their place in Node-1 (panel P1-01) when the panel was re-installed after Node-2 ingress.

FE-2-16 Dan Tani unpacked the HMS DRK (Health Maintenance System/Defibrillator Resupply Kit), exchanging consumables and batteries in the defibrillator with new items from the DRK delivered on STS-120. *[Installed was battery #1021, with backup battery #1020 stored.]*

Tani also set up and photo-documented the new INTEGRATED IMMUNE saliva collection payload, to be used later by himself and Peggy. *[For his use in connection with his EVA-2 spacewalk tomorrow, Dan carried the Immune saliva collection items with him into the Airlock (A/L) before Campout lockup. Immune protocol requires the collection to occur first thing post-sleep, before eating, drinking and brushing teeth, and all samples will be stored at ambient temperature.]*

In preparation for tomorrow's EVA-2 by Scott Parazynski & Dan Tani, FE-2 Anderson prepared the DCS 760 digital still cameras for the spacewalk and charged the DCS batteries after their EVA-1 use.

Also working in the A/L, Scott and Dan prepared their EMU/spacesuits and the A/L EL (Equipment Lock), swapping EMU batteries, and checking out the REBA powered suit equipment and tools.

After completing A/L EL configuration for the first spacewalk tomorrow and conducting a joint one-hour review of EVA-2 timeline & procedures with all crewmembers at ~1:05pm, the two spacewalkers, Parazynski (EV1) and Tani (EV3), began their "campout" in the "Quest" A/L, starting mask prebreathe at ~3:28pm, then closing hatches and initiating depressurization of the CL (Crewlock) from 14.7 to 10.2 psi. Sleep for the ISS crew commenced at 4:38pm, for the Shuttle crew at ~5:08pm.

EVA-2 will begin tomorrow (Sunday) at ~5:58am EDT and last an estimated 6h 30min, nominally ending at 12:28pm. Paolo Nespoli and Peggy Whitson will again be IV-1 and IVA-2 (Intravehicular) crewmembers.

[Main objectives of EVA-2 are:

- *Disconnect Z1-to-P6 fluid umbilical QDs (Quick Disconnects);*
- *Detach P6 truss from Z1 truss element;*
- *Outfit Node-2 (handrails, trunnion/keel pin, covers, gap spanners, caps, CBM restraints, WIFs);*
- *CETA (Crew & Equipment Translation Aid) S1 handrail inspection for suspected MMOD (micrometeoroid/orbital debris) impacts;*
- *Stbd SARJ (Solar Alpha Rotary Joint) inspection;*
- *Configure SFU (squib firing unit) on S1 truss to launch condition for radiator deployment;*
- *Reconnect MBSU (Main Bus Switching Unit) jumpers to support P6 startup on P5;*
- *RPCM R&R (Remote Power Controller Module Removal & replacement);*
- *Install PDGF (Power & Data Grapple Fixture) on Node-2.*

*The CETA S1 handrail inspection and S3/S4 SARJ inspection for potential damage will be performed by EV3 Tani, while EV1 Parazyński will concentrate on the critical Node-2 outfitting. It is expected that Dan will subsequently be able to assist in the installation of the PDGF. Background on SARJ: Starting on 9/2 the starboard SARJ has shown an increased current value to the drive motor (as high as 0.9A) whereas the portside SARJ has continued to operate nominally with a drive current around 0.3A. EVA-2 has been replanned to provide Dan an opportunity to inspect the SARJ for obvious visible problems.]*

ISS crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-1), TVIS treadmill (FE-2), and RED resistive exercise device (CDR, FE-1).

Later, Yuri copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week). *[Polar HRM developed a failure in its transmitter during the last few days. After some of her heart rate data were lost, CDR Whitson switched to a new spare, restoring the HRM.]*

Malenchenko also conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables. *[Regular daily SOZh maintenance consists of replacement of the KTO & KBO solid waste containers, replacement of an EDV-SV waste water and EDV-U urine container, replacement of the KOV EDV for the Elektron-intended water, and processing U.S. condensate water as it becomes available in a filled CWC from the Lab humidifier. Weekly SOZh reports (on*

*Sundays) to TsUP/Moscow deal with number & dates of water and urine containers, counter readings of water consumption & urine collection, and total operating time of the POTOK air filtration system.]*

Working on the IMS (Inventory Management System), FE-2 Anderson updated/edited its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

FE-1 Malenchenko and FE-2-16 Tani again had about 60 minutes each for general station familiarization and acclimatization, as is standard daily rule for the first two weeks after starting station residency.

Troubleshooting continued on the Shuttle PGSC network which has had some issues. *[A mini network was established for crew sleep last night. Today, all the network cables were to be replaced, using Shuttle spares and some excess ISS PGSC equipment.]*

At ~2:03pm EDT, the combined crews supported a PAO TV event with three news media from the new “Harmony” module,- CBS News (Peter King, Bill Harwood), Fox News (Gregg Jarrett), and WHAM-TV, Rochester, NY (Pam Melroy’s hometown).

*Quick-Look of tomorrow’s (FD6) Events (EDT):*

- 01:08am: Crew wake
- 03:38am: SSRMS walkoff from Lab to MBS (Mobile Base System)
- 06:03am: EVA-2 begins
- 06:18am: Z1-to-P6 umbilicals disconnect begins
- 08:13am: P6 truss detachment from Z1
- 12:18pm: EVA-2 ends
- 04:08pm: ISS Crew sleep
- 04:38pm: Shuttle Crew sleep
- 12:53am: S1 ETCS (External Thermal Control System) Radiator #1 deployment.

**Weekly Science Update** (*Expedition Sixteen -- 1st*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Radiation measurements will continue to be performed throughout the Increment 16..

*ANITA:* Completed.

*AT-Space:* Samples have been retrieved as part of early retrieval complement after 14S landing, and have been nominally delivered to science team for analysis.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*BIOKIN:* Samples have been retrieved as part of early retrieval complement after 14S landing, and have been nominally delivered to science team for analysis.

*CARDIOCOG-2:* Completed.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS):* “Clay, thanks for performing your final CCISS session. The PI appreciates your participation and looks forward to seeing you on the ground. Dan, we are working to get your first CCISS session listed as a Voluntary Science option during the PI’s FD14 to FD21 requirement.”

*CFE (Capillary Flow Experiment):* “Thank you so much Peggy and Clay for running the CFE Vane Gap-1 unit on GMT 295! For this operation, you performed a sweep of the vane angles in quadrant #3 (i.e. angles between 180 and 270 deg) of the vessel. As you probably surmised, we are most interested in the vane gap setting where a "finger" of fluid is drawn up the gap between the vane and wall of the test chamber. We feel we got some great data from this run! We were able to bracket the angles where critical gap wetting occurs and determine when the fluid reorients. The angles obtained are publishable and have furthered our understanding of the fluid dynamics, which we certainly appreciate. We realize that observing some of these test points are a little like "watching paint dry" and we certainly appreciate your patience in performing our run.”

*CHROMOSOME-2 (E14 SFP):* Completed.

*CIS (Malaysian SFP):* This experiment was targeted to focus on effects of microgravity and space radiation on gene mutations, expression of multi-drug resistance, and whole genome expression profiles (using the microarray approach) of eukaryotic cells compared to ground controls. Both adherent and non-adherent cells will be used and the former will also allow us to study the 3-dimensional cell growth in spaceflight compared to that grown on the ground using a rotating wall bioreactor.

*CSI-2/CGBA (CGBA Science Insert #2/Commercial Generic Bioprocessing Apparatus):* In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* Complete.

*CSLM-2 (Coarsening in Solid-Liquid Mixtures 2):* “After almost 32,000 orbits of the CSLM-2 ECUs around the earth, CSLM-2 and SAMS hardware were installed into the MSG WV on GMT 296 (EQU 1 and SPU 2). The vacuum vent leak test was

then successfully performed. Finally, the ECU was powered on to perform the re-programming steps which configures the specific parameters for each SPU soak time and delay. Upon completion of this activity, the log files were downlinked to verify successful re-programming. The fact that this operation was a success also verifies that the ECU booted properly after five+ years on orbit. CSLM-2 is now awaiting crew time to perform the actual science runs.”

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Complete.

*EMCH (Elastic Memory Composite Hinge):* Complete.

*EPO (Educational Payload Operation) Kit C:* Planned.

*ETD (Eye Tracking Device):* First session for Yuri Malenchenko has been performed nominally on 10/18.

*Integrated Immune: In Progress*

*IMMUNO (Saliva Sampling):* Inc-15 first session samples are currently stowed in MELFI Dewar #2. Inc15 second session samples (2 blood, 2 urine syringes and saliva tubes) have been returned on 14S. Preliminary information indicates that samples were not retrieved with other early items as planned. Science impact is expected, but still under assessment.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MIS (Malaysian SFP):* The goal of this experiment was specifically to study *A. baumannii* (non-motile) and *E. cloacae* (motile) conducted in microgravity environment and later, using genomic and proteomic tools to establish the gene expression and protein profiles and mass spectrometry to identify the specific proteins that are differently expressed.

*MISSE (Materials ISS Experiment):* Ongoing.

*MOP (VC-13):* In-flight questionnaires by SFP have been collected daily from 10/10 to 10/19. No negative reporting. Pre-flight questionnaires have been handed-over to ESA.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 “Pirs”.

*MULTIGEN-1:* Plants in B1 EC have unfortunately degenerated even more, and at

this stage science team does not expect anymore stem development for these plants in B1. Plant in the A2 EC is in a healthy state. Just before the planned power outage related to 10A docking on 10/25 (GMT298), science team has observed some peculiar motions of the leaves which should lead to imminent stem development. Should the stem appear, 2D then 3D-recordings of stem circumnutation will begin for several days, making use of any possibility to get additional science between the planned power outages during the 10A mission.

*MUSCLE (VC-13 SFP)*: In-flight questionnaires by the SFP have been collected daily from 10/10 to 10/19. No negative reporting. Pre-flight questionnaires have been handed-over to ESA.

*MSG-SAME (Microgravity Science Glovebox)*: Complete.

*NEOCYTOLYSIS (E14 SFP)*: Complete.

*NOA-2 (Nitric Oxide Analyzer)*: Planned.

*NUTRITION*: “Peggy, thanks for successfully completing your first Nutrition and Repository session.”

*PCS (Malaysian SFP)*: The goals of the PCS experiment were to compare the crystal growth behavior of lipases on earth with that grown in microgravity; to characterize the effect of microgravity on the crystal growth behavior of lipases; to test conditions that will improve the protein crystallization process on earth as well on space; to compare the quality of protein crystal grown under microgravity to those of earth-grown; to compare the 3D crystal structures obtained on the earth and in space.

*P-KINASE*: Samples have been retrieved as part of early retrieval complement after 14S landing. These will be shipped to the US next week.

*PMDIS (Perceptual Motor Deficits in Space)*: Complete.

*SAMPLE*: Samples of cosmonaut sessions #1 and #2, plus Surfaces and Cultures have been downloaded on 14S and handed-over to science team for analysis.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems)*: n/a

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight)*: “Peggy & Dan, thanks for donning your Actiwatch. We are working to get your first download initialization session added to the task list per your request.”

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Ongoing.

No CEO (Crew Earth Observations) target uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 9:50am EDT [= epoch]):

Mean altitude -- 341.7 km

Apogee height -- 343.5 km

Perigee height -- 339.9 km

Period -- 91.37 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.00027

Solar Beta Angle -- -59.7 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51166

**Significant Events Ahead** (all dates Eastern, some changes possible):

- 10/28 (FD6) -- EVA-2 (5:58am-12:38pm; Parazynski/Tani)
- 10/28 (FD6) -- P6 remove from Z1 truss (~8:13am)
- 10/30 (FD8) -- EVA-3 (5:28am-12:38pm; Parazynski/Wheelock)
- 10/30 (FD8) -- P6 install on P5 truss (~6:03am)
- 11/01 (FD10) -- EVA-4 (4:28am-9:13am; Parazynski/Wheelock)
- 11/02 (FD11) -- EVA-5 (3:58am-10:38am; Whitson/Malenchenko)

11/04/07 -- STS-120/Discovery/10A undocking (FD13/1:34am)

11/04/07 -- 2:00am: DST ends, ST begins

11/06/07 -- STS-120/Discovery/10A deorbit burn 3:47am EST

11/06/07 -- STS-120/Discovery/10A landing @ KSC (FD15/4:48am EST)

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis undocking  
12/18/07 -- STS-122/Atlantis landing  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**

04/15/09 -- **Constellation's Ares I-X Launch.**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 10/26/07

**Date:** Friday, October 26, 2007 3:05:58 PM

**Attachments:**

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### **ISS On-Orbit Status 10/26/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 141 for Clayton Anderson. Flight Day 4 for STS-120; Day 2 of Joint Ops.*

**Node-2 “Harmony” was successfully installed on the Node 1 “Unity” portside dock, about one hour ahead of schedule.**

**Also, today’s EVA-1 was completed exceedingly successful.** Shuttle Mission Specialists Scott Parazynski (EV1) & Doug “Wheels” Wheelock (EV2) –

- Retrieved the SASA (S-band Antenna Structural Assembly) from the Z1 truss and stowed it in the Shuttle PLB (Payload Bay) in the sidewall FSE (Flight Support Equipment) carrier,
- Prepared Node 2 for removal from PLB by loosening four special EDF (Expandable Diameter Fastener) bolts, releasing a PDGF (Power & Data Grapple Fixture) from its PLB sidewall carrier and stowing it temporarily on Node 2, then removing PCBM (Passive CBM) contamination covers & connector caps, disconnecting LTA (Launch to Activation) power cables, and closing & re-snapping an open Node-2 hatch window cover,
- Disconnected P6-to-Z1 fluid umbilicals, by removing SPDs (Spool Positioning Devices), closing valves, demating QDs (Quick Disconnects) & remating to dummy QDs,
- Deployed a thermal shroud on the retracted & cinched P6 aft PVR (Photovoltaic Radiator), and
- Installed thermal shrouds on the 2B/starboard & 4B/port SSUs (Sequential Shunt Units).

*[Official start time of the spacewalk was 6:02am EDT (~26 min ahead of schedule). It ended at 12:16pm. Total EVA duration (PET = Phase Elapsed Time) was 6h 14m. It was the 93<sup>rd</sup> spacewalk for ISS assembly & maintenance and the 65<sup>th</sup> from the station (28 from Shuttle, 43 from Quest, 22 from Pirs) totaling 386h 52m. After*

*today's EVA, a total of 107 spacewalkers (77 NASA astronauts, 20 Russians, and ten astronauts representing Japan-1, Canada-4, France-1, Germany-1 and Sweden-3) have logged a total of 574h 16m outside the station on building, outfitting and servicing. It also was the 115<sup>th</sup> spacewalk by U.S. astronauts.]*

After the pre-berthing preps by Scott & Wheels, Node-2 grappling by Steph Wilson & Dan Tani with the SSRMS (Space Station Remote Manipulator System), transfer of "Harmony" out of the Discovery PLB to the ISS and berthing it at the Node-1 portside CBM went smoothly, finishing about an hour ahead of time (capture 1<sup>st</sup> stage: 11:35am, 2<sup>nd</sup> stage: 11:40am). *[The Italian-built Node-2, measuring 23.6 ft (7.2 m) long, 14.5 ft (4.5 m) wide, with a mass of 31,500 lbs (14,288 kg), is a utility hub, providing air, electrical power, water and other systems essential to support life on the station. It will distribute resources from the ISS truss to the U.S. "Destiny" Lab, the ESA "Columbus" research module and the Japanese "Kibo" experiment module when the latter are added to the station. "Harmony" will act as an internal connecting port and passageway to additional international science labs and cargo spacecraft. The name "Harmony" was chosen from an academic competition involving more than 2200 kindergarten-through-high school students from 32 states. Six different schools submitted this name. A NASA panel selected "Harmony" because it symbolizes the spirit of international cooperation embodied by the ISS, as well as the module's specific role in connecting the international partner modules. Winning schools were Browne Academy, Alexandria VA, Buchanan Elementary School, Baton Rouge LA, League City Intermediate School, Lubbock, TX, West Navarre Intermediate School, Navarre FL, and World Group Home School, Monona, WI.]*

Post-docking activities yesterday included the important activation of the SSPTS (Station-to-Shuttle Power Transfer System). *[For the second time in history, the ISS is transferring power to the Orbiter to allow it to remain docked longer. As per plan, three (of four) OPCUs (Orbiter Power Converter Units, ##1A, 1B, & 2A) are currently active, transmitting up to 6.45 kW of power to the Shuttle PTUs (Power Transfer Units).]*

After the 8.5-hr sleep period before the spacewalk, the Airlock Crewlock (A/L CL) hatch was cracked at ~2:18am EDT for a hygiene break/with mask prebreathe for Parazynski and Wheelock, after spending the night on 10.2 psi campout. Around 3:00am, the hatch was closed again by IV-2 Peggy Whitson for EVA preparations in 10.2 psi, followed by EMU purge & prebreath. Afterwards, Whitson supported the CL depressurization and EV1/EV2 egress (6:01am).

Before EVA start, FE-1 Malenchenko verified powerdown of onboard ham radio equipment (Kenwood in SM & Ericsson in FGB) to prevent RF interference with the

EMUs. He also turned on the CBCS (Centerline Berthing Camera System), which was previously set up at the Node-1 portside hatch for Node-2 berthing.

Malenchenko then started the transfer of nitrogen (N<sub>2</sub>) gas from the Shuttle to the ISS hi-P storage tankage.

Afterwards, Yuri took care of the new Russian Sokol suits delivered on STS-120, performing leak checks on suits and gloves, then hanging them up for drying. Later, the Sokols were stowed in the Soyuz 15S Orbital Module.

Additionally, the FE-1 also serviced the ASU toilet system in the Soyuz TMA-11 by replacing its discolored collector unit with a new spare.

Yuri also conducted the (currently) daily job of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- and FGB-to-Soyuz tunnels, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently ten persons.]*

As part of ongoing handover activities, Clay Anderson introduced his successor, Dan Tani, to the use of the Russian SKDS CMS (Pressure Control & Atmosphere Monitoring System/Countermeasure System), which takes readings of potentially harmful contaminants in the Service Module (SM). The hardware was then returned to initial stowage. *[The CMS uses preprogrammed microchips to measure Formaldehyde (H<sub>2</sub>CO, methanal), Carbon Monoxide (CO) and Ammonia (NH<sub>3</sub>), taking one measurement per microchip.]*

As another handover activity, Clay and Dan spent some time on an overview of CMS (Crew Medical Systems) exercise equipment aboard the station, a standard requirement for “newcomers” before the first physical exercise session. *[The review covered identification, stowage location and explanatory notes of physical exercise accessories, exercise prescriptions, and detailed instructions for using the TVIS treadmill, RED resistive exerciser, CEVIS cycle ergometer (in particular CEVIS control panel positioning in front of the bike user for HR/Heart Rate data reception, and the HRM heart rate monitor.)*

While the spacewalk went on, CDR Whitson prepared DCS-760 digital still cameras for taking photographs of the spacewalker’s EMU gloves after ingress, to be downlinked for damage inspection.

The ISS crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle

ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR), and VELO bike with bungee cord load trainer (FE-1).

Later, Yuri copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week). *[Polar HRM developed a failure in its transmitter during the last few days. After some of her heart rate data were lost, CDR Whitson switched to a new spare, restoring the HRM.]*

Malenchenko checked out and replaced the batteries of Shuttle-delivered CSA-CP (Compound Specific Analyzer- Combustion Products) units (one prime, 3 backup), then deployed two units at the SM Central Post and two in Node-1.

The CDR worked on the water supply system, offloading the Lab CCAA (Common Cabin Air Assembly) condensate tank to CWC (Contingency Water Container) for processing to be used in Elektron.

After the Node-2 was successfully berthed (11:40am) and the SSRMS had ungrappled, Malenchenko deactivated and removed the CBCS (Centerline Berthing Camera System) from Node-1 portside hatch and stowed it temporarily in Node-1. *[All cables and equipment were left connected for later use of the CBCS on the Node-2 forward port for berthing the PMA-2 (Pressurized Mating Adapter 2) prior to the transfer of the Node-2/PMA-2 "stack" to the Lab forward port after Discovery's departure.]*

Peggy Whitson again assisted the spacewalkers when they returned, handling CL repress, joint A/L post-EVA ops and later starting the downlink of EVA imagery.

Also after EVA-1 ingress, Malenchenko conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables. *[Regular daily SOZh maintenance consists of replacement of the KTO & KBO solid waste containers, replacement of an EDV-SV waste water and EDV-U urine container, replacement of the KOV EDV for the Elektron-intended water, and processing U.S. condensate water as it becomes available in a filled CWC from the Lab humidifier. Weekly SOZh reports (on Sundays) to TsUP/Moscow deal with number & dates of water and urine containers, counter readings of water consumption & urine collection, and total operating time of the POTOK air filtration system.]*

Working on the IMS (Inventory Management System), FE-2 Anderson updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

FE-1 Malenchenko and FE-2-16 Tani had about 60 minutes each for general station familiarization and acclimatization, as is standard daily rule for the first two weeks after starting station residency.

*IWIS Thruster Test Update:* The dedicated IWIS (Internal Wireless Instrumentation System) thruster test early this morning was successfully completed, with all objectives met. The total time in free drift for the test was 21 min. The port & starboard SARJs (Solar Alpha Rotary Joints) were successfully returned to Autotrack once the station was back under Momentum Manager attitude control (~1:05am EDT). The IWIS accelerometer on the Shuttle-side was installed yesterday near the Shuttle cycle ergometer and connected to the ISS IWIS with a drag-through cable. *[Since the IWIS thruster test was performed earlier than originally planned due to RGS (Russian Ground Site) comm window constraints, no time remained for IMMT (ISS Mission Management Team) review of the overnight drag-through cable, as is normally required.]*

*SARJ Inspection:* As a last-minute modification of the EVA-2 timelines on FD6 (Sunday, 10/28), specialists are considering an EVA inspection of the starboard SARJ as part of the ongoing root cause investigation of the recent SARJ drive motor current trends (vibrations/drag). The STBD SARJ inspection would be combined with a CETA (Crew & Equipment Translation Aid) cart rail inspection. The change was approved this morning by the IMMT (ISS Mission Management Team). *[The inspection would cover the 22 MLI (multi-layer insulation) segments about the joint, MLI cover outboard & inboard swing bolts, exposed areas in between MLI cover gaps, and possible hardware interaction with MLI covers. If some outfitting tasks cannot be completed because of the EVA-2 timeline changes, they would be moved to a later spacewalk or a later flight.]*

*Smoke Detector Inhibit:* The #2 smoke detector (SD-2) annunciation function in Node-1 was inhibited yesterday since it has been the source of many false-fire alarms in the past. A reoccurrence could impact 10A, EVA Campouts and other high priority activities. SD-2 remains powered for providing telemetry to the ground. SD-1 in the Node-1 is still fully active.

*Discovery TPS Inspection:* The Shuttle Program has found no requirement for a focused inspection of the Orbiter's TPS (Thermal Protection System) tomorrow. After careful ground inspection, the TPS has been cleared. *[A small gap filler near RCC panel #20 is exposed (~0.3 in.) but not in a critical area.]*

*Quick-Look of tomorrow's (FD5) Events (EDT):*

- 01:38am: Crew wake
- 05:08am: OBSS (Orbiter Boom Sensor System) handoff to SSRMS &

berthing in Shuttle PLB

- 06:33am: Node-2 Vestibule Outfitting
- 08:43am: **Node-2 Ingress**
- 09:33am: Transfers
- 01:03pm: EVA-2 Procedures Review
- 03:18pm: Campout begins (Parazynski/Tani)
- 05:08pm: Crew sleep.

No CEO (Crew Earth Observations) target uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 11:04am EDT [= epoch]):

Mean altitude -- 341.8 km

Apogee height -- 343.7 km

Perigee height -- 339.9 km

Period -- 91.37 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0002856

Solar Beta Angle -- -56.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 70 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51151

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

- 10/27 (FD5) -- Node-2 Ingress
- 10/28 (FD6) -- EVA-2 (5:58am-12:38pm; Parazynski/Tani)
- 10/28 (FD6) -- P6 remove from Z1 truss (~8:13am)
- 10/30 (FD8) -- EVA-3 (5:28am-12:38pm; Parazynski/Wheelock)
- 10/30 (FD8) -- P6 install on P5 truss (~6:03am)
- 11/01 (FD10) -- EVA-4 (4:28am-9:13am; Parazynski/Wheelock)
- 11/02 (FD11) -- EVA-5 (3:58am-10:38am; Whitson/Malenchenko)

11/04/07 -- STS-120/Discovery/10A undocking (FD13/1:34am)

11/04/07 -- 2:00am: DST ends, ST begins

11/04/07 -- **50-Year Anniversary of launch of female canine Laika, first living space passenger, into orbit**

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11/06/07 -- STS-120/Discovery/10A landing @ KSC (FD15/4:48am EST)  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)  
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12/18/07 -- STS-122/Atlantis landing  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
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01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
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02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
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09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch

10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)

04/??/09 -- **Six-person crew on ISS**

04/15/09 -- **Constellation's Ares I-X Launch.**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/25/07  
**Date:** Thursday, October 25, 2007 1:57:29 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/25/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 140 for Anderson. Flight Day 3 for STS-120; Day 1 of Joint Ops.*

Shortly after orbital sunrise (8:33am EDT), **STS-120/Discovery docked successfully** at the PMA-2 (Pressurized Mating Adapter-2) port at 8:40am EDT, smoothly flown by Pam Melroy & George "Zambo" Zamka. The station now hosts ten occupants again as Mission 10A is underway. *[All docking hooks were closed at 8:53am. The station was reoriented at ~9:00am as planned to minimize the risk of micrometeoroid/debris impacts upon the Shuttle (-x-axis in velocity vector, +z-axis in local vertical, i.e., turned around by ~180 deg). Hatches were open at 10:38am, and the new crew was welcomed aboard the ISS and given the mandatory safety briefing. Later, the OBSS was successfully unberthed in the Shuttle PLB (Payload Bay) with the SSRMS (Space Station Remote Manipulator System), and handed off to the SRMS (Shuttle RMS), while Clay Anderson and Stephanie Wilson maneuvered the SSRMS to EVA-1 support position.]*

Preparatory to Shuttle arrival, ISS CDR Peggy Whitson –

- Closed the Lab science window shutter as protection against thruster plumes,
- Connected the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cables at the Lab & Cupola RWS (Robotics Work Stations) for the SSRMS video coverage,
- Configured the headset cable connections for the RPM (R-Bar Pitch Maneuver, completed at 7:43am), and later
- Activated camera timer & video equipment for Orbiter approach/docking coverage.

Also before the actual docking, FE-1 Malenchenko performed final STTS communications configuration checks for the docking. After the docking, Yuri switched USOS/RS (US Segment/Russian Segment) comm systems to their mated-

flight mode.

The regular installation of the IWIS (Internal Wireless Instrumentation System) hardware for measuring and recording structural dynamics during docking was completed by Whitson yesterday as a get-ahead task.

Anderson and Malenchenko conducted a final checkout of the photo/video equipment for the RPM (Rbar Pitch Maneuver) before Endeavour docking. They also verified the readiness of the communications configuration required for the photo shoot.

Shortly before the docking, the FE-2 configured the Russian MCS (Motion Control System) for the automatic "PMA-2 Arrival" mode, an operational sequence used to monitor Orbiter arrival at the PMA-2. *[At "Capture Confirmed" (8:40am), ISS attitude was immediately set to "free drift" to allow dampening out relative motions of ISS and Discovery (with the ODS dampers/shock absorbers), then maneuvered to "Mated TEA" (Torque Equilibrium Attitude) to account for the new overall configuration with Discovery docked.]*

Prior to final approach, Pam & Zambo took the Discovery through the scheduled RPM at ~600 ft distance under the ISS, a full-circle backflip to allow digital imagery of its TPS (thermal protection system) from the ISS by Flight Engineers Anderson & Malenchenko. *[The ISS crew had about 100 seconds actual shooting time to photograph the Orbiter TPS. Yuri operated the 400mm-lens DCS (digital camera system) and Clayton wielded the long-barreled 800mm camera, each one attempting to obtain about 150 pictures. After the docking, the images were to be downlinked for further analysis.]*

After the RPM, at a distance of ~575 ft, Discovery initiated TORVA (Twice Orbital Rate V-bar Approach). The final Go for Docking was given, and Discovery closed in at a slow rate for docking at 8:40am (all hooks closed: 8:53am).

After leak checks of the ODS (Orbiter Docking System) vestibule for about an hour, hatches were opened at ~10:38am. Hand shakes and hugs between the crews came 15 minutes later.

Before and during ISS/STS hatch opening, Yuri Malenchenko performed the standard collection of air samples with the Russian AK-1M sampler in the SM, FGB, Lab, and then also in the Orbiter.

Prior to the start of docked mission activities. CDR Whitson took care of the transfer of joint mission books from the Shuttle over to ISS. *[The new books, contained in a Ziplock bag and CTB (Crew Transfer Bag), include the SODF (Station Operations*

*Data Files) procedures for the docked mission and emergency situations.]*

Yuri Malenchenko and Dan Tani transferred the Soyuz IELKs (Individual Equipment & Liner Kits, Russian: USIL), removing Anderson's IELK from Soyuz TMA-11/15S for stowage and installing Tani's IELK in the 15S Descent Module instead.

Also after the docking, Malenchenko conducted the routine maintenance of the SOZ<sub>h</sub> system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables, and today also the (currently) daily job of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- and FGB-to-Soyuz tunnels, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently ten persons.]*

Working on the IMS (Inventory Management System), the FE-1 updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Joint crew activities after the Welcome Ceremony included –

- Safety briefing for all,
- Dan preparing the Orbiter approach imagery for downlink,
- Peggy setting up the transfer equipment for supplying Shuttle O<sub>2</sub> (oxygen) to the ISS to support the overnight "Campout" by Parazynski & Wheelock in the Airlock (A/L) for denitrogenation/pre-breathe,
- Scott, Peggy & Doug transferring the Shuttle EMU/spacesuits and EVA tools to the ISS,
- Clay preparing the DCS 760 digital still cameras for EVA-1 and charging the DCS batteries after their RPM use,
- Scott, Peggy, Doug & Paolo preparing the EMUs and the A/L EL (Equipment Lock), swapping EMU batteries, and
- Checking out the REBA powered suit equipment and tools.

After completing A/L EL configuration for the first spacewalk tomorrow and conducting a joint review of EVA-1 timeline & procedures with all crewmembers at ~2:00pm, the two spacewalkers, Scott Parazynski (EV1) and Doug Wheelock (EV2), will begin their "campout" in the "Quest" A/L, starting mask prebreathe, while configuring EVA tools, at ~3:53pm, then closing hatches and initiating depressurization of the CL (Crewlock) from 14.7 to 10.2 psi. Sleep for the ISS crew will commence at 5:08pm, for the Shuttle crew at ~5:38pm.

EVA-1 will begin tomorrow at ~6:28am EDT and last an estimated 6h 30min,

nominally ending at 1:08pm. Paolo Nespoli will be IV (Intravehicular) crewmember. [Main objectives are:

- SASA (S-band Antenna Support Assembly) retrieval from Z1 truss & transfer to Shuttle cargo bay for stowage in SASA FSE (Flight Support Equipment);
- Node 2 preparation for unberthing from PLB;
- PDGF (Power & Data Grapple Fixture) removal from PLB & temp stowage on Node 2;
- Disconnect Z1 to P6 fluid umbilical QDs (Quick Disconnects);
- Install P6 Aft PVR (Photovoltaic Radiator) shroud; and
- Install P6 SSU (Sequential Shunt Unit) shroud, plus photo ops; and
- Monitor unberthing of Node 2 with SSRMS and its installation on Node 1 port CBM (Common Berthing Mechanism) by Steph, Clay & Dan.]

Earlier today, the ISS crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1). *[No exercise allowed on ISS or Shuttle while both arms are grappled (~12:55pm) or during tonight's IWIS thruster test (~12:20am).]*

Later, Anderson copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week). *[Polar HRM developed a failure in its transmitter during the last few days. After some of her heart rate data were lost, CDR Whitson switched to a new spare, restoring the HRM.]*

FE-1 Yuri Malenchenko had 60 minutes for general station familiarization and acclimatization, as is standard daily rule for the first two weeks after starting station residency

Later in the day (~1:40pm), the Elektron was reactivated at 32 amps, with Yuri monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

*IWIS Thruster Test:* Early tomorrow morning, the station will briefly go into Free Drift again to support Flight Day 4 (FD4) IWIS thruster testing at 12:24am, with return to RS thrusters at 12:40am and handover back to US Momentum Management at 1:05am.

*SM Thermal Control System Update:* FE-1 Yuri Malenchenko yesterday successfully completed repairs on the SM thermal control loops (KOB-1,2). Currently three of the four 3SPN2 & 4SPN2 pump panels are functional, each panel with two operating pumps (ENAs). The 4<sup>th</sup> pump panel on KOB-1 has failed and both pumps were removed.

Hardware is planned to be resupplied on a future Progress. The newly installed pumps were activated, checked out and are functioning nominally.

No CEO (Crew Earth Observation) photo targets uplinked for today.

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Eccentricity -- 0.000276

Solar Beta Angle -- -52.3 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 60 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51132

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

- 10/26 (FD4) -- EVA-1 (6:28am-1:08pm; Parazynski/Wheelock)
- 10/26 (FE4) -- Node 2 install onto Node 1 (~12:33pm)
- 10/28 (FD6) -- EVA-2 (5:58am-12:38pm; Parazynski/Tani)
- 10/28 (FD6) -- P6 remove from Z1 truss (~8:13am)
- 10/30 (FD8) -- EVA-3 (5:28am-12:38pm; Parazynski/Wheelock)
- 10/30 (FD8) -- P6 install on P5 truss (~6:03am)
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- 11/02 (FD11) -- EVA-5 (3:58am-10:38am; Whitson/Malenchenko)

11/04/07 -- STS-120/Discovery/10A undocking (FD13/1:34am)

11/04/07 -- 2:00am: DST ends, ST begins

11/04/07 – **50-Year Anniversary of launch of female canine Laika, first living space passenger, into orbit**

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11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
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01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
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02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
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09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)

10/14/08 -- Soyuz TMA-13/17S launch

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04/??/09 -- **Six-person crew on ISS**

04/15/09 -- **Constellation's Ares I-X Launch.**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/24/07  
**Date:** Wednesday, October 24, 2007 1:29:21 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/24/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 139 for Anderson. "Discovery incoming."*

**STS-120/Discovery continues its catch-up flight**, for tomorrow's FD3 ISS docking at ~8:35am EDT, to begin ISS Stage 10A.

*[Hatch opening: expected at ~10:33am, followed by: Safety Briefing, OBSS (Orbiter Boom Sensor System) handoff from SSRMS (Space Station Remote Manipulator System) to SRMS (Shuttle RMS) at ~11:23am, Soyuz seat liner transfer (for the Tani/Anderson exchange), and preparations for the first spacewalk, EVA-1, by EV1 Parazynski & EV2 Wheelock, on 10/26, preceded by their overnight Campout in the Airlock (A/L) for denitrogenation/pre-breathe. Objectives of the nominal 14-day mission: Delivering & installing Node 2 "Harmony" in a temporary spot on Node 1 "Unity" (later to be fitted with the PMA-2 {Pressurized Mating Adapter 2} and then moved to the Lab front end), returning the SASA (S-band Antenna Structural Assembly) from the Z1 truss to Discovery for Earth return, delivering new ISS-16 crewmember Dan Tani & bringing Clayton Anderson back home, moving the P6 truss segment to its permanent position at the left end of the ISS truss beam, deploy the P6 solar arrays and heat dispersal radiator, and conducting a total of five spacewalks, including one to test a shuttle tile repair technique. Landing will nominally take place at KSC on FD15 (11/6) at 4:50am EST.*

*Esperia Background: Crewmember Paolo Angelo Nespoli, who is shepherding the Italian-built Node 2, is the third Italian flying on the Shuttle (after Umberto Guidoni in 2001 and Roberto Vittori in 2002 & 2005). Paolo's program "Esperia" (from the ancient Greek name for the Italian peninsula), involves his playing the key role as IVA (intravehicular activity) astronaut for three of the five spacewalks including the installation of Node 2, plus a joint ESA/ASI program of human physiology and biology experiments, as well as a number of educational activities.]*

Before breakfast, CDR Whitson, FE-1 Malenchenko and FE-2 Anderson started the day with the periodic session of the Russian biomedical routine assessments PZEH-

MO-7/Calf Volume Measurement and PZEH-MO-8/Body Mass Measurement (first for CDR & FE-1, ninth for FE-2), using the IM mass measurement device which Yuri Malenchenko afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

Afterwards, Yuri had over 4 hrs on his schedule for tackling the critical & complex "plumbing" job of restoring both (redundant) Russian Thermal Control System (TCS) loops, STR KOB-1 & STR KOB-2, to some function. *[Background: Each of the KOB loops contains 2 pump panels (3SPN2 & 4SPN2) with 2 pump assemblies (ENA) each (i.e., a total of 8 pumps between KOB-1 and KOB-2). After the pump failure on 10/22, the TCS software algorithm did not activate any of the 4 pump panels or their corresponding ENAs, triggering an "SM Heating Loops Failure-RS" caution alert. Ground controllers cleared the comm problem and activated the pump panels. On KOB-2, 3SPN2 is now operating nominally with both pumps. There are currently two spare pumps onboard, delivered on 15S, and two additional spares are to be brought up in December. Today, Yuri swapped one of the operational ENAs from KOB-2's 4SPN2 and installed it in place of the failed pump assembly in 4SPN2 of KOB-1. The pump R&R was then tested and closed out. Thus, the SM now has at least one operational pump assembly for each TCS loop. Later both ENA pumps in the KOB-2 4SPN2 panel will be replaced with the 2 onboard spare pumps. Both the Vozdukh CO<sub>2</sub> removal system and the Elektron O<sub>2</sub> generator were turned off temporarily for the repair activities.]*

FE-2 Anderson powered on the Cupola RWS (Robotic Work Station) and Airlock (A/L) A31p laptops in preparation for their support of the 10A docked mission.

CDR Whitson performed the periodic offloading of the Lab CCAA (Common Cabin Air Assembly) dehumidifier's condensate tank, filling a CWC (Contingency Water Container, #1054) with the collected water slated for processing. Peggy also secured two condensate samples in sample bags for return to Earth on the Shuttle. *[Estimated offload time before termination (leaving ~5.25 kg in the tank): ~30 min.]*

Later, Malenchenko took the CWC #1064 to the Russian Segment (RS) for the

periodic (about twice a month) replenishing of the Elektron oxygen generator's water supply for electrolysis, filling the KOV thermal loops' EDV container. Once filled, the EDV was connected to the BPK transfer pump for processing. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Meanwhile, Whitson conducted the weekly 10-min. CWC audit as part of the continuing WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card, to be updated with today's data, lists 24 water containers (~934.7 liters total), including two unusable (~85.9 l), for the four types of water identified on board: technical water (579.3 l, for Elektron, flushing, hygiene), potable water (304.2 l), condensate water (32.2 l), waste/EMU dump and other (19.0 l).]*

The FE-2 switched cooling on the starboard & portside CCAAs in the Lab, closing the ITCS LTL (Internal Thermal Control System/Low Temperature Loop) flow to the first and initiating it on the second. This is a standard maintenance item.

Peggy and Clayton temporarily moved two EMU (Extravehicular Mobility Unit) spacesuits (#3006, #3018) with bags from the A/L CL (Crewlock) to the Node to make room for Friday's first 10A EVA by Parazynski and Wheelock. *[EMU 3018 will be used by Dan Tani during EVA-2 and by Peggy during EVA-5, whereas EMU 3006 will be Yuri's spacesuit on EVA-5.]*

After yesterday's practice by Anderson and Malenchenko of taking photos during tomorrow's Orbiter RPM (Radius Vector Pitch Maneuver), Clay today set up the Sony camcorder, equipped with fresh battery, to allow video recording of the RPM image-taking (for use in training). The FE-2 then configured the DCS still cameras with 400mm & 800mm lenses in the SM, to be used by himself and Yuri, equipping them with charged batteries and formatted memory cards.

Later, Clayton set up and checked out the Lab RWS and DOUG software for tomorrow's (FD3) SSRMS (Space Station Remote Maneuvering System) operations. *[The SSRMS will be used after docking tomorrow for unberthing the OBSS (Orbiter Boom Sensor System) and handing it off to the SRMS (Shuttle Remote Maneuvering System), which then maneuvers it for TV viewing of Node 2 in the cargo bay, while SSRMS maneuvers to EVA-1 setup position for supporting the first spacewalk on Friday.]*

Also in support of 10A, CDR Peggy Whitson –

- Installed the ISS-side string of the BPSMU (Battery Powered Speaker Microphone Unit) *[after Shuttle docking, cables connected to the Shuttle-half*

- of the dragthrough QD (quick disconnect) will be installed by the Shuttle crew],*
- Performed, with some ground support, the pressurization process on the PMA-2 (Pressurized Mating Adapter #2), followed by leak checking and additional preparations of the PMA for the Shuttle's arrival *[the pressurization equipment was left connected for the post-docking leak checks],* and
  - Configured & connected the bypass cables of the VDS VTR (Video Distribution System/Video Tape Recorder) for passing video to and from the station on the Lab's starboard side and allowing the station to receive video from the Orbiter on the Lab's port side.

Meanwhile, FE-1 Malenchenko conducted the routine maintenance of the SOZh (ECLSS/Environment Control & Life Support System) in the SM, including ASU toilet facilities systems/replaceables.

Later, working off his discretionary "time permitting" task list, Yuri updated/edited the IMS (Inventory Management System)'s standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Also from the voluntary task list, the FE-1 used the SKDS CMS (Pressure Control & Atmosphere Monitoring System/Countermeasure System) to take readings of potentially harmful contaminants in the SM. The hardware was then returned to initial stowage. *[The CMS uses preprogrammed microchips to measure Formaldehyde (H<sub>2</sub>CO, methanal), Carbon Monoxide (CO) and Ammonia (NH<sub>3</sub>), taking one measurement per microchip.]*

Another task for Malenchenko is the periodic MLI (Multi-Layer Insulation) Nikon D2X photography on Soyuz TMA-11/15S, docked at the FGB nadir port, from the DC1 EVA hatch 2 window, to assess the condition of the spacecraft's insulation.

Clay did the periodic check of running U.S. payloads, i.e., cleaning the ANITA (Analyzing Interferometer for Ambient Air) inlet plus inspecting and filter cleaning of the CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to Earth.]*

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2), and VELO cycle with bungee cord load trainer (FE-

1).

Afterwards, Clayton transferred the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

As is standard procedure for newly arrived station residents, the E16 crew yesterday had their PMCs (Private Medical Conferences). For Yuri, this included filling out the questionnaire for the standard Russian biomedical Braslet-M/Anketa ("bracelet/questionnaire") test procedure. *[If he so desires, Yuri may evaluate a number of "bracelet" cuffs for their usefulness in suppressing the adverse effects of micro-G for the "newcomer" aboard the station during the acute phase of adaptation to weightlessness, if there are such indications. The "bracelets" are compression cuffs attached to a belt and worn on the upper thighs over the coveralls, intended as countermeasures against the initial micro-G effects of blood filling (vascularity) in the upper torso (heaviness and blood pulsation in the head), facial puffiness, nasal stuffiness, painful eye movement, and vestibular disorders (dizziness, nausea, vomiting). They create artificial blood accumulation in the upper thirds of the thighs, causing some of the circulating blood volume to relocate from the upper body to the lower extremities, thereby (hopefully) correcting the adverse hemodynamic effect of micro-G and thus improving the crewmember's working capability. The actual compression cuff in the Braslet units is a combination of alternating multi-layer tensile and non-tensile elements, whose distension by body movements creates elastic forces that produce the necessary pressure on the body surface.]*

At ~7:10am EDT, Yuri Malenchenko downlinked a TV PAO message of greetings to the Moscow Research & Development Institute of Radio Communications (MNIIRC) via VHF over RGS (Russian Ground Site) on DO3. *["Our crew would like to extend our congratulations and best wishes to the members of your Institute on this remarkable day of its 80<sup>th</sup> anniversary! It is the hard work and dedication of your scientists, engineers, technicians, and workers that created communications hardware for manned vehicles and long-duration stations. From Yuri Alexeyevich Gagarin's first comm session with his famous phrase "Off we go!" (Pojechali!) and Sergei Pavlovich Korolev's comm call "Cedar, Cedar, I'm Dawn One! (Kedr, Kedr, ya Zarya One!) to this day, we have reliable radio communications with Earth which we are using now to send this greeting message to your team..."]*

With today's temporary shutdown of the Elektron electrolysis system, oxygen (O<sub>2</sub>) gas remaining in Progress M-61/26P is currently being used for daily cabin air refreshes as required to maintain proper ppO<sub>2</sub> (O<sub>2</sub> partial pressure).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:22am EDT [= epoch]):

Mean altitude -- 342.0 km

Apogee height -- 343.8 km

Perigee height -- 340.1 km

Period -- 91.37 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0002715

Solar Beta Angle -- -48.0 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 60 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51117

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

10/25/07 -- STS-120/Discovery/10A docking (FD3/8:35am EDT) 5 EVAs, incl. Node 2 & PMA-2 external preps)

- 10/26 (FD4) -- EVA-1 (6:28am-1:08pm; Parazynski/Wheelock)
- 10/26 (FE4) -- Node 2 install onto Node 1 (~12:33pm)
- 10/28 (FD6) -- EVA-2 (5:58am-12:38pm; Parazynski/Tani)
- 10/28 (FD6) -- P6 remove from Z1 truss (~8:13am)
- 10/30 (FD8) -- EVA-3 (5:28am-12:38pm; Parazynski/Wheelock)
- 10/30 (FD8) -- P6 install on P5 truss (~6:03am)
- 11/01 (FD10) -- EVA-4 (4:28am-9:13am; Parazynski/Wheelock)
- 11/02 (FD11) -- EVA-5 (3:58am-10:38am; Whitson/Malenchenko)

11/04/07 -- STS-120/Discovery/10A undocking (FD13/1:34am)

11/04/07 -- 2:00am: DST ends, ST begins

11/06/07 -- STS-120/Discovery/10A deorbit burn 3:47am EST

11/06/07 -- STS-120/Discovery/10A landing @ KSC (FD15/4:48am EST)

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis undocking  
12/18/07 -- STS-122/Atlantis landing  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour undocking  
02/29/08 -- STS-123/Endeavour landing  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 10/23/07  
**Date:** Tuesday, October 23, 2007 3:06:26 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/23/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 138 for Anderson. "Crew hit the deck running."*

**STS-120/Discovery lifted off flawlessly right on time at 11:38am EDT** on Mission ISS-10A and is currently catching up with the ISS, carrying the seven-member crew of Commander Pam Melroy, Pilot George Zamka and Mission Specialists Scott Parazynski, Doug Wheelock, Stephanie Wilson, Daniel Tani, and Paolo Nespoli (ESA/Italy). STS-120 is the 120<sup>th</sup> space shuttle flight, the 34<sup>th</sup> flight for the Discovery, and the 23<sup>rd</sup> flight to the station. It will include the most number of EVAs conducted while the shuttle is docked to ISS. Last not least, it is the first time both the Shuttle CDR and the ISS CDR are female. With other words: **We are off to another great mission!**

*[Docking is scheduled for FD3 (Thursday, 10/25, at about 8:35am EDT, to begin ISS Stage 10A. After hatch opening (~10:33am), first tasks are safety briefing, OBSS (Orbiter Boom Sensor System) handoff from SRMS (Shuttle Remote Manipulator System) to SSRMS (Space Station RMS) at ~11:23am, Soyuz seat liner transfer (for the Tani/Anderson exchange), and preparations for the first spacewalk, EVA-1, by EV1 Parazynski & EV2 Wheelock, with overnight Campout of the two in the Airlock (A/L) for denitrogenation/pre-breathe. Objectives of the nominal 14-day mission include: Returning the SASA (S-band Antenna Structural Assembly) from the Z1 truss to the Discovery for Earth return, delivering & installing Node 2 "Harmony" in a temporary spot on Node 1 "Unity" (later to be moved to the PMA-2 (Pressurized Mating Adapter 2) where the Discovery will be docked), delivering a new ISS crewmember & bringing another one back to Earth, moving the P6 truss segment plus retracted solar arrays to their permanent position at the very end of the left side of the ISS truss beam, and conducting (with Peggy Whitson & Yuri Malenchenko) a total of five spacewalks, including one to test a shuttle tile repair technique. Landing will nominally take place at KSC on FD15 (11/6) at 4:50am EST.]*

CDR Whitson set up and prepared the equipment for her first session with the CSLM-2 (Coarsening in Solid-Liquid Mixtures 2) experiment, starting with inspection and activation of the MSG (Microgravity Science Glovebox). *[Further steps included installing ECU (Electronic Control Unit), the first SPU (Sample Processing Unit), and SAMS (Space Acceleration Measurement System) hardware into the MSG WV (Work Volume), connecting power & data cables from CSLM-2 hardware to MSG, followed by installing the experiment's vacuum hose, checking it for leaks, later attaching CSLM-2 D/L Adapter and activating the experiment. Afterwards, Whitson disconnected the CSLM-2 D/L Adapter, secured MSG WV and powered down the MSG.]*

FE-1 Malenchenko and FE-2 Anderson undertook another standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, using DCS-760 digital still cameras in the SM, taking photos of an Orbiter cut-out as practice of the bottomside mapping of the Discovery, using the 400mm & 800mm telephoto lenses. *[The skill training prepares crewmembers for the bottomside mapping of the Orbiter at the arrival of STS-120/10A on Thursday. During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Atlantis from SM windows 6 & 8, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

Clay Anderson worked on recharging a total of 8 batteries for the DCS digital still cameras in two batches of four simultaneously. The batteries will be used for the Orbiter RPM photo shoot on Thursday. *[Rbar = along the radius vector of the ISS, downward.]*

Also for the upcoming high-pressure RPM P/TV (Photo/Video) activity, Clayton worked throughout the day on formatting the necessary P/TV storage devices. *[Formatted, in a Kodak DCS 760 camera on station power, were five 1GB EVA Flash Cards plus three PCMCIA 1GB Microdrives, each one taking ~20 minutes. Afterwards, the reformatted cards and microdrives were transferred to the SM (Service Module) for the DCS 760 camera configuration to get ready for the RPM documentation.]*

Peggy Whitson had ~2 hrs reserved for more preparations for the upcoming 10A spacewalks (the first one on Friday, 10/26), in the US Airlock (A/L). *[After first configuring the A/L and EMU (Extravehicular Mobility Unit)/spacesuits, the CDR completed the LAS (Load Alleviation Strap) "health" inspection on 55' safety & waist tethers started on 10/18, then reviewed & self-studied background EVA refresher material on SAWs (Solar Array Wings), ACBM (Active Common Berthing*

*Mechanism) inspection, and MMOD (Micrometeoroid/Orbital Debris) shields.]*

After the recent (10/7) R&R (Removal & Replacement) of three failed TVIS treadmill roller bearings, Whitson and Anderson today joined in a 30-min. “handover” session for Clay to familiarize the CDR with the difficulties and solutions of changing out the remaining forward roller bearings in the near future.

FE-1 Malenchenko set up the pumping equipment and initiated (later closed out) the periodic transfer of urine from 5 EDV-U containers in the Service Module (SM) to the Rodnik BV2 tanks of Progress M-61 (26P). *[Leak checks performed by the crew on 10/8-9 on the membrane (expulsion bladder) of the Progress’ Rodnik BV1 tank showed that BV1 is unsuitable for liquid waste transfer due to a small leak in the tank’s bladder.]*

The FE-1 also spent about 90 min of major equipment servicing in the ASU toilet facility, changing out all replaceable ASU parts with new components, viz., the separator, two receptacles (PR & MP), four hoses, a T-connector, an elbow fitting, an indicator, a filter insert (F-V), the pretreat container (E-K) with its hose. All old parts were discarded as trash. The ASU is now fully functional again. *[E-K contains five liters of pre-treat solution, i.e., a mix of H<sub>2</sub>SO<sub>4</sub> (sulfuric acid), CrO<sub>3</sub> (chromium oxide, for oxidation and purple color), and H<sub>2</sub>O (water). The pre-treat liquid is mixed with water in a dispenser (DKiV) and used for toilet flushing.]*

Clay Anderson rearranged the P2 location in the Node, required for accessing Node 2 after berthing at its temporary location, by moving stowage equipment out of the way

Peggy completed the routine maintenance of the SOZh (ECLSS/Environment Control & Life Support System) system in the SM.

Yuri conducted the daily updating/editing of the standard daily IMS (Inventory Management System) “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO cycle with bungee cord load trainer (FE-1).

Afterwards, Clayton transferred the crewmembers’ exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM

(Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

At ~6:45am, the FE-2 powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), to conduct, at 6:50am a ham radio exchange with students at Giosue' Carducci, Santa Marinella, Italy, about 60 km northwest of Rome. Questions to the crew were uplinked by ARISS (Amateur Radio on ISS) beforehand. [*"How long can you stay in space without getting any injuries to your body?"; "How do you wash yourself on board the ISS?"; "What kind of disadvantages does zero-gravity cause?"; "Is the ISS's orbit preprogrammed or does it occur that astronauts have to steer it manually? If so, how is it done?"*]

Yuri Malenchenko had 60 minutes for general station familiarization and acclimatization, as is standard daily rule for the first two weeks after starting station residency.

Early this morning, MCC-Houston conducted another BCC (Backup Control Center) dry run in test mode, with no involvement of the ISS crew or vehicle. The seven-hour exercise started at 1:00am EDT. [*Purpose of this periodic exercise is to demonstrate BCC functionality under Russian assets while providing proficiency training for Moscow-HSG (Houston Support Group) personnel at the HSR (Houston Support Room) and TsUP-Moscow specialists.*]

*Conjunction Update:* The possible conjunction identified yesterday for tomorrow evening is no longer a concern.

*Harmony Update:* Node 2 "Harmony" was named in a nationwide academic competition. Six different schools submitted the same name. Students from each school attended today's Discovery launch.

*Trivia Update:* Luke Skywalker's Lightsaber is onboard of Discovery in honor of the 30<sup>th</sup> anniversary of the Star Wars franchise.

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10/28 (FD6) -- P6 remove from Z1 truss (~8:13am)

10/30 (FD8) -- EVA-3 (5:28am-12:38pm; Parazynski/Wheelock)

10/30 (FD8) -- P6 install on P5 truss (~6:03am)

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11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite (NET)

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis undocking

12/18/07 -- STS-122/Atlantis landing

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**

02/06/08 -- Progress M-62/27P undocking

02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS (NET)  
02/16/08 -- STS-123/Endeavour/1J/A docking  
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04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
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04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
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04/26/08 -- STS-124/Discovery/1J docking  
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09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
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10/14/08 -- Soyuz TMA-13/17S launch  
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04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch.**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 10/22/07  
**Date:** Monday, October 22, 2007 12:40:45 PM  
**Attachments:** [image002.gif](#)  
[image003.gif](#)  
[image004.gif](#)

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**FOR OFFICIAL USE ONLY**

### **ISS On-Orbit Status 10/22/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 137 for Anderson. Underway: Week 1 of Increment 16. Crew rest day.*

Crew wake/sleep cycle has “normalized”, Today’s wakeup - 1:00am, sleeptime – 4:30pm EDT.

By her voluntary choice, CDR Whitson conducted her first work with the CFE (Capillary Flow Experiment) payload, completing the detailed mapping of the CFE VG-1 Vane Gap 1) vessel. After a successful session, Peggy disassembled the equipment and stowed it. *[CFE consisted of three experiments - CFE-CL (Contact Line), CFE-ICF (Interior Corner Flow), and CFE VG, for the study of different aspects of capillary flow of fluids in containers with complex geometries. Except for today’s run on the model of fuel tanks with locating vanes (to determine the maximum allowable vane gap and sensitivity to asymmetry), the CFE experiments have been concluded.]*

In further preparation for the upcoming STS-120/10A docked period, the crew performed a 90-min. review of the 10A timeline, followed by a timeline teleconference with ground specialists via audio/S-band.

Peggy Whitson disconnected the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable from the Lab RWS (Robotics Work Station).

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO cycle with bungee cord load trainer (FE-1).

Afterwards, Clay Anderson transferred the crewmembers’ exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

At ~7:45am EDT, the crew downlinked a PAO TV message of greetings for an upcoming Science Festival at Rice University, to be held on Saturday, 10/27, sponsored by Sally Ride, with Eileen Collins as keynote speaker. Special emphasis of the event will be on female

students at Rice and the importance of their pursuing a future in science and math.

At ~12:10pm, FE-2 Clay Anderson supported a "Crew Choice" linkup with Grade K students, college students and faculty at Hastings College, Nebraska (Clayton's school). Questions for the FE-2 were uplinked beforehand. [*"Did you know you wanted to be an astronaut when you were in 6<sup>th</sup> grade?"; "I've heard reports that astronaut food is "gross". Any truth to this?"; "What are the possible risks for not following the work-out routine?"; "While a student at Hastings College, did you ever think that one day you would be an astronaut for NASA and is that what you were striving for while working toward your undergraduate/graduate degrees?"*]

Later today, Whitson and Anderson will have their weekly PFCs via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop), Peggy at ~1:25pm, Clay at ~5:05pm.

*SARJ Anomaly:* At ~10:36am, Flight Controllers in Houston started a 3-hr. test on the starboard Solar Array Rotary Joint (STBD SARJ) in order to troubleshoot the cause of some vibration observed on the STBD side of the station's truss structure when the SARJ on that side rotates, combined with some off-nominal readings on some STBD SARJ parameters. After the test, the STBD SARJ remains "parked" at 240 deg angle until the wing feathering prior to 10A docking. [*Purpose of the TAS (Torque-As-Stepper) test, which torqued the array through 360 deg with small angular steps, was to help in characterization of the SARJ's friction. Both BGAs (Beta Gimbal Assemblies) and TRRJ (Thermal Radiator Rotary Joint) remained in Autotrack mode. The regular BGA Bias setting (for drag reduction) was zero to maximize power generation during the test.*]

*EWIS Update:* Most cables for EWIS (External Wireless Instrumentation System) were successfully installed by the crew last Saturday (10/20). Last step was not completed, but it is on the "job jar" task list to be finished when the crew has time.

*Conjunction:* A possible ISS conjunction with space debris on 10/24 (Wednesday) at 8:59pm EDT is currently being assessed by station and Shuttle teams. Early prediction of miss distance: 25 km.

*KOB-2 Heating Loop Pump Failure:* The Russian TCS (Thermal Control System) in the Service Module (SM) experienced an off-nominal automatic switch from KOB-2 (heating loop 2) to KOB-1. Checkouts determined that one of two pumps on the 4SPN2 pump panel is not working. The KOB-1 loop is running nominally with two pumps functioning on its pump panel and nominal software algorithms. Specialists are considering installing two new pumps (delivered on 15S) for restoring both panels with two pumps functioning on each.

*SRVK-2 Failure:* Also in the SM, channel 2 of the SRVK-2 water processing/supply system failed during the last four days. SRVK-1 is operating normally. Assessment by RSC-Energia specialists is underway.

*Correction:* Re yesterday's item on the offnominal ballistic re-entry of Yurchikhin, Kotov & Shukor in Soyuz TMA-10: Bowersox, Budarin & Pettit, who re-entered ballistically on 5/3/03 in TMA-1, were ISS Expedition 6, not Expedition 3. (**See pictures from Kustanai yesterday, below**)

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**STS-120/Discovery Launch Update:** The launch window opens tomorrow, 10/23, at 11:33am EDT and closes 10 min later, at 11:43pm. Optimal launch time is 11:38am.

Probability of KSC weather prohibiting 10/23 launch: 60% (cumulus clouds, showers, low-cloud ceiling);

Probability of KSC weather prohibiting 10/23 tanking: 10%;

24-hour delay:

Probability of KSC weather prohibiting launch: 40%

Probability of KSC weather prohibiting tanking: 10%

48-hour delay:

Probability of KSC weather prohibiting launch: 40%

Probability of KSC weather prohibiting tanking: 10%

**ISS Orbit** (as of this morning, 2:13am EDT [= epoch]):

Mean altitude -- 342.1 km

Apogee height -- 344.1 km

Perigee height -- 340.1 km

Period -- 91.38 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0002994

Solar Beta Angle -- -38.8 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 95 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51082

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5 (11:38am EDT)

10/25/07 -- STS-120/Discovery/10A docking (FD3/8:35am EDT) 5 EVAs, incl. Node 2 & PMA-2 external preps)

10/26 (FD4) -- EVA-1 (6:28am-1:08pm; Parazynski/Wheelock)

10/26 (FE4) -- Node 2 install onto Node 1 (~12:33pm)

10/28 (FD6) -- EVA-2 (5:58am-12:38pm; Parazynski/Tani)

10/28 (FD6) -- P6 remove from Z1 truss (~8:13am)

10/30 (FD8) -- EVA-3 (5:28am-12:38pm; Parazynski/Wheelock)

10/30 (FD8) -- P6 install on P5 truss (~6:03am)

11/01 (FD10) -- EVA-4 (4:28am-9:13am; Parazynski/Wheelock)

11/02 (FD11) -- EVA-5 (3:58am-10:38am; Whitson/Malenchenko)

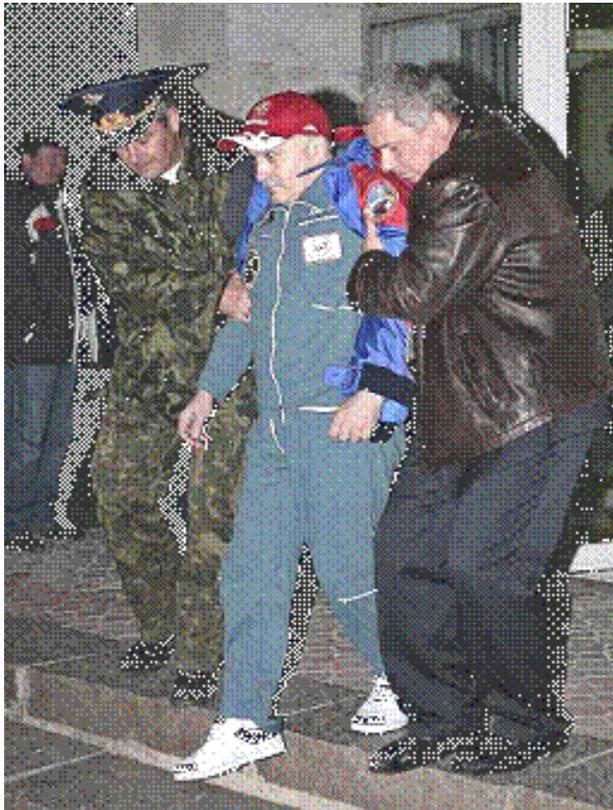
11/04/07 -- STS-120/Discovery/10A undocking (FD13/1:34am)

11/04/07 -- 2:00am: DST ends, ST begins

11/06/07 -- STS-120/Discovery/10A deorbit burn 3:47am EST  
11/06/07 -- STS-120/Discovery/10A landing @ KSC (FD15/4:50am EST)  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
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12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
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02/06/08 -- Progress M-62/27P undocking  
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04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**



**SAR choppers approaching 14S touchdown site (10/21/07)**





**Fyodor Yurchikhin in Kustanai  
Kustanai/Kazakhstan (10/21/07)**

**Reception of 14S Crew in**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/21/07  
**Date:** Sunday, October 21, 2007 12:39:44 PM  
**Attachments:** [image002.gif](#)

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### ISS On-Orbit Status 10/21/07



All ISS systems continue to function nominally, except those noted previously or below. *Sunday – first day alone for CDR Whitson, FE-1 Malenchenko and FE-2 Anderson. Day 136 for Anderson. Ahead: Week 1 of Increment 16 (Increment 15 lasted 26 weeks, four less than Inc-14).*

***Yest posadka!*** *(We have Landing!)* Welcome back home, Fyodor Yurchikhin, Oleg Kotov (Russia's Cosmonaut No. 100) and Muszaphar Shukor! After 197 days in space (195 aboard ISS), Soyuz TMA-10/14S, carrying two-thirds of the Expedition 15 crew plus the Malaysian SFP, **landed successfully** this morning at 6:36am EDT in the steppes of Kazakhstan, with the crew in excellent condition. Touchdown occurred ~340 km short (west) of the intended site near Arkalykh. After arrival of the recovery forces, the crew was reported to be out of the spacecraft at about 6:55am. They were flown to Kustanai, Kazakhstan, with Star City near Moscow their next stop later today. Mission length for Yurchikhin & Kotov: 196d 17h 5m; for SFP Shukor: 10d 21h 14m. *[Undocking from the ISS SM aft port was at 3:14am, deorbit burn from 5:47am-5:51am. According to TsUP/Moscow, the trajectory undershoot of the returning 14S Descent Module by about 340 km at touchdown was due to a switch of the on-board computer to the (secondary) Ballistic Descent Mode (BS), reported by the crew at 6:18am, instead of the lift-vector-controlled reentry using banking maneuvers (roll angle changes) commanded by the (primary) Automatically Controlled Descent Mode (AUS). An*

*official commission has been formed to investigate the computer glitch which appears similar to the one experienced during the re-entry of Soyuz TMA-1 with the Expedition 3 crew of Ken Bowersox, Nikolai Budarin and Donald Pettit on 5/3/03. Instead of flying on the closed-loop-guided trajectory designed to reduce peak deceleration & heating while extending the downrange, the ballistic mode results in a steeper trajectory, ~2g's higher deceleration forces on the crew (7g max instead of 5g), and an undershoot of around ~250 mi. The crew was never in any increased danger, and the SAR (Search & Rescue) personnel did not require any additional time to reach the capsule, which they reportedly had in sight during parachute descent from ~4600m altitude down.]*

The ISS crew, currently asleep since ~7:00am EDT, has an unusual day: off-duty with wake-up tomorrow morning at 1:00am & bedtime at 4:30pm (to 1:00am Tuesday).

After Soyuz departure at 3:14am, FE-1 Yuri Malenchenko manually closed the PEV (Pressure Equalization Valve) between the Service Module (SM) and its docking port vestibule and later restored the onboard communications system (STTS) setup which had been configured for Soyuz undocking and descent, including the VHF comm link from the TMA-10 SA to TsUP via RGS (Russian Ground Site).

Peggy Whitson performed the daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), Whitson updated/edited its standard "delta file" on the Russian VKS (Auxiliary Computer System), including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The new ISS CDR also restored the onboard video configuration in the Lab by disconnecting the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable from the Lab RWS (Robotics Work Station) which was required for video coverage of the Soyuz departure.

During the undocking, structural dynamics data were taken (and subsequently downlinked via S-band) by the external S0 truss-mounted SDMS (Structural Dynamics Measurement System). *[SDMS is ground controlled and can store only about 10 minutes of data before starting to overwrite its buffer; thus, SDMS took data only from 2 minutes prior to 3 minutes after the undocking.]*

Shortly before bedtime this morning, Clay Anderson terminated the 24-hr data collection of the heart rate study of the CCISS (Cardiovascular & Cerebrovascular

Control on Return from ISS) experiment, downloading the Holter Monitor and Actiwatch data, then stowing the CCISS hardware.

No Science Summary today.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

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Probability of KSC weather prohibiting 10/23 tanking: 10%;

- 24-hour delay:

Probability of KSC weather prohibiting launch: 40%

Probability of KSC weather prohibiting tanking: 10%

- 48-hour delay:

Probability of KSC weather prohibiting launch: 30%

Probability of KSC weather prohibiting tanking: 10%

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04/??/09 -- **Six-person crew on ISS**  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/20/07  
**Date:** Saturday, October 20, 2007 3:12:11 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/20/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday - Day 9 (last) of joint E15/E16 operations. Day 197 in space for Yurchikhin & Kotov, Day 135 for Anderson.*

Last day before Soyuz 14S undocking, with both E-15/E-16 crews on an irregular wake cycle:

- Wake-up this morning: 3:30am EDT;
- Pre-undocking rest period for all: 12:00pm-6:00pm;
- Sleep time for E-16 crew: 7:00am (10/21) -1:00am (10/22).

CDR Fyodor Yurchikhin, FE-1-16 Yuri Malenchenko and CDR-16 Peggy Whitson had about 60 min. of dedicated handover time between them. In addition, there were "generic" handovers where crewmembers are scheduled together to complete various designated standard tasks.

Before breakfast, Dr. Whitson completed the last day of her first session with the NASA/JSC experiment NUTRITION (her second session will be on her Flight Day 30). During today's part, she collected another urine sample for storage in the MELFI (Minus-Eighty Laboratory Freezer for ISS). The sampling kit was then stowed away. *[The current NUTRITION project expands the previous Clinical Nutritional Assessment profile (MR016L) testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

FE-2 Anderson completed his second CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS) session, started yesterday, by setting up and donning the Holter Monitor, donning the CBPD (Continuous Blood Pressure Device), performing the Baro Study, doffing the CBPD, and starting the 24-hr passive heart rate data collection. Data are recorded on a PCMCIA memory card, with the HRF

(Human Research Facility) rack laptop for control. Data download and equipment stowage is scheduled tomorrow (~6:15am) before crew sleep after the 24-hr period.

*[CCISS studies the effects of long-duration spaceflight on crewmembers' heart functions and their blood vessels that supply the brain (=“cerebrovascular”). Learning more about the changes in cardiovascular & cerebrovascular systems in zero-G could lead to specific countermeasures that might better protect future space travelers. For the Baro study of CCIS, heart rate and blood pressure are being recorded for resting and timed breathing for 5 min, with no caffeine or food (water is acceptable) allowed two hours before the start of the Baro Study and no exercise prior to the Baro Study.]*

FE-2 Anderson performed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Anderson also worked on the IMS (Inventory Management System), updating/editing its standard “delta file” on the Russian VKS (Auxiliary Computer System), including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

At ~8:235am, Clay had a PFC (Private Family Conference) via S-band for audio and Ku-band for video.

Yurchikhin was in charge of final loading & stowing return equipment in the severely volume-limited Soyuz capsule, including dismantling remaining return payloads and transferring them to the TMA-10 Descent Module (SA). Before start of the 4-hr. pre-undocking crew rest period, Fyodor and FE-1-16 Yuri Malenchenko began transfers with P-KINASE, REGENERATION, CONJUGATION and STATOKONIA experiment hardware, kits and samples, packed in the BIOKIT-5 kit and Biocont-T container cold packs, while FE-1 Kotov took care of other equipment to be returned to Earth.

*After the crew rest period (wake-up at ~6:00pm), additional experiment transfers to TMA-10 tonight will include gear, samples and data records of the IMMUNO, KUBIK-3, BIOEMULSION, SAMPLE, AT-Space and CONJUGATION payloads. CDR Yurchikhin will retrieve the*

Additionally, CDR Yurchikhin will retrieve the Japanese experiment GCF-JAXA (Granada Crystallization Facility) from the Russian TBU-04 (Universal Bioengineering Thermostat 04) incubator and carry it to the Soyuz for return.

Also transferred for stowage in 14S will be SFP (Space Flight Participant) Sheikh Shukor's VC-13 experiment data for CIS (Cells in Space), MIS (Microbes in Space),

PCS (Protein Crystallization in Space), TOP (Study of Torques in Microgravity) and the three previous ESA experiments – ETD (Eye Tracking Device), MOP (Motion Perception) and MUSCLE/LBP (Low Back Pain).

CDR-16 Whitson and FE-2 Anderson are to fill out the regular FFQ (Food Frequency Questionnaire), his 15<sup>th</sup>, her first, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Malenchenko will perform the daily checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatchways, including the SM-to-Soyuz tunnel, and the FGB-to-Node passageway. *[This is important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

Whitson will work on the MELFI (Minus-Eighty Laboratory Freezer for ISS) facility, reconfiguring the MOOCE (MELFI On-Orbit Characterization Experiment) tray and inserting ICEPACs into the container module.

With Soyuz TMA-10 no longer available as emergency CRV (crew return vehicle) for the coming Increment, Malenchenko is to verify correct transfer of its three Emergency Procedures ODF (DAS EhP) books to the new CRV, TMA-11, docked at the FGB nadir port.

At ~10:45pm, Kotov and Malenchenko are scheduled to configure the onboard communications system (STTS) for the undocking, both working to set up, check and maintain the VHF comm link from the TMA-10 SA to TsUP/Moscow via RGS (Russian Ground Site) and the comm system for Soyuz undocking and descent.

Afterwards, at ~11:30pm, CDR Yurchikhin and FE-1 Kotov will be activating the spacecraft and also testing the S-band comm links from Soyuz. *[The STTS comm system will be reset by Yuri to nominal configuration a few minutes after 14S departure (~3:35am).]*

Clay Anderson will verify proper closure of the Lab science window shutter for protection from thruster plumes during undocking and power down the ham radio equipment in SM and FGB at ~7:30pm to prevent RF interference with the departing spacecraft.

Tomorrow at ~3:10am Peggy is scheduled for another routine daily maintenance of

the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), Whitson is to update/edit its standard "delta file" on the Russian VKS (Auxiliary Computer System), including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

After Soyuz departure, Peggy will also disconnect the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable at the Lab RWS (Robotics Work Station) which was required for video coverage of the Soyuz departure.

The E-16 crewmembers are scheduled for their workout, on the CEVIS cycle ergometer (CDR-16, FE-2-16), and RED resistive exerciser (FE-1-16, FE-2).

After Soyuz ingress by the returning E15+SFP crew (~11:00pm), video-downlinked to TsUP/Moscow, and comm and suit leak checks, Kotov and Yurchikhin will remove the BZV QD (quick disconnect) clamps (~11:45pm) and close transfer hatches between 14S & SM aft port (~12:10am), followed by the standard one-hour hatch hermeticity check (Daily Orbit 13). *[Russian thrusters will be disabled during the 1h 40m period from start of BZV removal to leak check completion. Afterwards, ISS attitude control authority is handed over to Russian MCS (Motion Control System) with thrusters enabled, later to be returned to U.S. CMG momentum management. For the actual undocking at 3:14am, the station will briefly (9 min.) float in free drift.]*

If everything is nominal, the return to Earth of the TMA-10 spacecraft with Yurchikhin, Kotov and Shukor tomorrow morning will proceed along the following approximate event sequence (all times EDT; updated):

- Returning crew dons biomed harnesses & Kentavr (Centaur) suits --- 12:25am
- Crew ingresses Soyuz SA (Descent Module) from BO (Orbital Module) --- 1:25am
- ISS attitude control handover to RS --- 1:30am;
- SA/BO hatch closed --- 1:55am
- Spacesuit leak checks --- 1:55-2:20am
- SA/BO hatch leak check --- 2:20-3:00am
- ISS in free drift --- 3:10-3:19am;
- Hooks Open command --- 3:11am; automatic undocking from SM on DO15;
- Separation springs action (delta-V ~0.12 m/sec) --- 3:14pm; (retrograde to ISS flight)
- Manual separation burn (15 sec, ~0.65 m/sec) --- 3:17am;
- ISS attitude control handover to US --- 4:10am;

- Deorbit Burn start (delta-V 115.2 m/sec) --- 5:47:11am (115.2 m/s);
- Deorbit Burn complete --- 5:51:33am
- Tri-Module separation (140.1 km) --- 6:11:28am;
- Atmospheric entry (102.5 km, with ~170 m/sec) --- 6:14:20am;
- Max G-load (32.7 km alt) --- 6:20:57am;
- Parachute deploy command (10.6 km alt) --- 6:22:48am;
- 14S Landing --- 6:37:05am EDT; 4:37:05pm local Kazakhstan time;
- Local Sunset --- 8:27am (6:27pm local).

*[Note: Kazakhstan time is GMT+6h; EDT+10h.]*

### **What will the Soyuz TMA-10 crew experience during their reentry/descent?**

For the reentry, Yurchikhin, Kotov and Shukor are wearing the Russian Kentavr anti-G suit. *[The Kentavr garment is a protective anti-g suit ensemble to facilitate the return of a long-duration crewmember into the Earth gravity. Consisting of shorts, gaiters, underpants, jersey and socks, it acts as countermeasure for circulatory disturbance, prevents crewmember from overloading during descent and increases orthostatic tolerance during post-flight adaptation. Russian crewmembers are also advised to ingest fluid-electrolyte additives, viz., three sodium chloride tablets during breakfast and after the midday meal, each time with 300 ml of fluid, and two pills during the meal aboard Soyuz before deorbit.]*

#### Before descent:

Special attention will be paid to the need for careful donning of the medical belt with sensors and securing tight contact between sensors and body.

During preparation for descent, before atmosphere reentry, crewmembers settle down comfortably in the Kazbek couches, fasten the belts, securing tight contact between body and the seat liner in the couch.

#### During de-orbit:

Dust particles starting to sink in the Descent Module (SA) cabin is the first indication of atmosphere reentry and beginning of G-load effect. From that time on, special attention is required as the loads increase rapidly.

Under G-load effect during atmosphere reentry the crew expects the following experience:

*Sensation of G-load pressure on the body, burden in the body, labored breathing and speech. These are normal sensations, and the advice is to "take them coolly". In case of the feeling of a lump in the throat, this is no cause to "be nervous". This is frequent and should not be fought. Best is to "try not to swallow and talk at this moment". Crew should check vision and, if any disturbances occur, create additional tension of abdominal pressure and leg muscles (strain abdomen by pulling in), in addition to the Kentavr anti-G suit.*

During deployment of pilot (0.62 & 4.5 square meters), drogue (16 sq.m.) and main (518 sq.m.) parachutes the impact accelerations will be perceived as a "strong snatch". No reason to become concerned about this but one should be prepared that during the parachutes deployment and change ("rehook") of prime parachute to symmetrical suspension, swinging and spinning motion of the SA occurs, which involves vestibular (middle ear) irritations.

It is important to tighten restrain system to fasten pelvis and pectoral arch. Vestibular irritation can occur in the form of different referred sensations such as vertigo, hyperhidrosis, postural illusions, general discomfort and nausea. To prevent vestibular irritation the crew should "limit head movement and eyes movement", as well as fix their sight on motionless objects.

Just before the landing (softened by six small rocket engines behind the heat shield):

Crew will be prepared for the vehicle impact with the ground, with their bodies fixed along the surface of the seat liner in advance. "Special attention should be paid to arm fixation to avoid the elbow and hand squat" (instruction). Landing speed: ~9.9 m/sec.

After landing:

Crew should not get up quickly from their seats to leave the SA. They were advised to stay in the couch for several minutes and only then stand up. In doing that, they should limit head and eyes movement and avoid excessive motions, proceeding slowly. They and their body should not take up earth gravity in the upright position too quickly.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:58am EDT [= epoch]):

Mean altitude -- 342.3 km

Apogee height -- 344.3 km

Perigee height -- 340.3 km

Period -- 91.38 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0003041

Solar Beta Angle -- -29.1 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.76  
Mean altitude loss in the last 24 hours -- 65 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 51055

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:14am/6:38am)  
10/23/07 -- STS-120/Discovery/10A **launch** -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5 (11:38am EDT)  
10/25/07 -- STS-120/Discovery/10A **docking** (FD3/8:35am EDT) 5 EVAs, incl. Node 2 & PMA-2 external preps)  
10/26 (FD4) -- EVA-1 (6:28am-1:08pm; Parazynski/Wheelock)  
10/26 (FE4) -- Node 2 install onto Node 1 (~12:33pm)  
10/28 (FD6) -- EVA-2 (5:58am-12:38pm; Parazynski/Tani)  
10/28 (FD6) -- P6 remove from Z1 truss (~8:13am)  
10/30 (FD8) -- EVA-3 (5:28am-12:38pm; Parazynski/Wheelock)  
10/30 (FD8) -- P6 install on P5 truss (~6:03am)  
11/01 (FD10) -- EVA-4 (4:28am-9:13am; Parazynski/Wheelock)  
11/02 (FD11) -- EVA-5 (3:58am-10:38am; Whitson/Malenchenko)  
11/04/07 -- STS-120/Discovery/10A **undocking** (FD13/1:34am)  
11/04/07 -- 2:00am: DST ends, ST begins  
11/06/07 -- STS-120/Discovery/10A deorbit burn 3:47am EST  
11/06/07 -- STS-120/Discovery/10A **landing** @ KSC (FD15/4:50am EST)  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking

04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch.**

***Happy Landing, Fyodor, Oleg and Muszaphar!***

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 10/19/07

**Date:** Friday, October 19, 2007 2:59:42 PM

**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 10/19/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 8 of joint E15/E16 operations. Day 196 in space for Yurchikhin & Kotov, Day 134 for Anderson.*

Aboard ISS, the E15/E16 crew rotation/handover period continues with full activity schedules for all six residents involved.

CDR Fyodor Yurchikhin and FE-1-16 Yuri Malenchenko had about 110 min. of dedicated handover time between them. In addition, there were "generic" handovers where crewmembers are scheduled together to complete various designated standard tasks.

Before breakfast, CDR-16 Whitson began her first session with the NASA/JSC experiment NUTRITION w/Repository, for which she had to forego exercising and food intake for eight hours. *[After collecting an initial urine sample, Whitson, assisted by Clay Anderson, followed it with phlebotomy, i.e., drawing blood samples (from an arm vein) which she first allowed to coagulate in the Repository, then spun in the HRF RC (Human Research Facility/Refrigerated Centrifuge) and finally placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. The equipment was then stowed. NUTRITION activities today included the required 24-hour data urine collection by Anderson, by securing samples during the day, all stored immediately in MELFI. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures*

*(exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

Later, CDR Yurchikhin used the Russian IPD-NH<sub>3</sub> Draeger tubes, on a cartridge belt with a pump, to check the cabin air for NH<sub>3</sub> (ammonia, from possible urine spillage), followed by the periodic air sampling with the AK-1M adsorber around the Service Module (SM) work table. The samplers were stowed in the Soyuz 14S Descent Module for analysis on the ground.

FE-1-16 Malenchenko performed the MO-22 Sanitary-Epidemiological Status check, part of the Russian MedOps program. *[To test for microflora, Yuri collected samples from surface areas of interior panels and hardware in the DC-1 Docking Compartment and on the SKV-2 air conditioner using cotton swabs and special test tubes which were then stowed in 14S for return to the ground.]*

FE-2 Anderson performed the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). *[Purpose of the 10-min. activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements. Two CSA-CP (CSA-Combustion Products) instruments recorded CO, HCN and HCl readings at the SM Central Post (#1060, prime) and in the Node (#1057, backup), while the CSA-O<sub>2</sub> units (#1063, #1042) looked for O<sub>2</sub> in the Lab and the CDMK (#1013) for CO<sub>2</sub> in SM and Lab. Also recorded were battery ticks. No battery changes required. The instruments were turned off afterwards, except for the prime CSA-CP #1060 unit, and returned to their regular locations. The two CSA-O<sub>2</sub> units, #1042 & #1063, were prepacked for return on 10A. The CSA-CPs also have O<sub>2</sub> sensors but they are out of calibration and their readings are currently omitted.]*

Yurchikhin completed the (currently) daily job of checkout/verification of IP-1 airflow sensors in the various RS (Russian Segment) hatchways, including the SM- and FGB-to-Soyuz tunnels, and the FGB-to-Node passageway. *[This is especially*

*important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

Oleg Kotov and Fyodor Yurchikhin performed the third and last 1.5-hour “installment” of their fifth and final training session in the "Chibis" ODNT suit as standard preparation of cosmonauts for returning into gravity, assisting each other in turn as CMO (Crew Medical Officer) during their individual 90-min runs. For FE-1, vital body readings were downlinked to RGS (Russian Ground Site) via VHF at 11:02am EDT on DO1 (Daily Orbit 1). For the CDR, readings were obtained with the Tenzoplus sphygmomanometer for blood pressure. The exercise was supported by specialist tagup via S-band. *[The below-the-waist reduced-pressure device ODNT (US: LBNP, Lower Body Negative Pressure) in the "Chibis" garment provides gravity-simulating stress to the body's cardiovascular/circulatory system for reestablishing the body's orthostatic tolerance (e.g., the Gauer-Henry reflex) after the six-month stay in zero-G. Fyodor's and Oleg's ODNT protocol today again consisted of first imbibing 150-200 milliliters of water or juice, followed by a sequence of progressive regimes of reduced (“negative”) pressure, set at -25, -30, -35 and -40 mmHg for five minutes each, then at -25, -30, and -40 mmHg, 10 minutes in each mode, and at -30 mmHg for 5 min, while shifting from foot to foot at 10-12 steps per minute. The body's circulatory system interprets the pressure differential between upper and lower body as a gravity-like force pulling the blood and body fluids “down”.]*

Floating in the Soyuz TMA-10/14S Orbital Module (BO), FE-1 Kotov dismantled and removed the LKT local temperature sensor commutator (TA251MB) of the BITS2-12 onboard telemetry system, along with its PZU-1M ROM (read-only memory) unit, now no longer required since the BO is to be jettisoned before 14S reentry. *[The electronics will be stowed on ISS for reuse in a future vehicle.]*

Anderson, Whitson and Malenchenko joined up for about an hour to review the preliminary timelines for the 10A spacewalks. Later, they conducted a teleconference with MCC-Houston specialists to discuss details. *[During the STS-120/10A docked period, starting on 10/25 (FD3) and ending on 11/4 (FD13), there will be five EVAs: 10/26 (FD4), 10/28 (FD6), 10/30 (FD8), 11/1 (FD10) and 11/2 (FD11). They will be conducted by three spacewalk teams: Parazynski & Wheelock (EVA-1, EVA-3, EVA-4), Parazynski & Tani (EVA-2), and Whitson & Malenchenko (EVA-5). Main activities during the EVAs will focus on transferring Node 2 “Harmony” to its temporary position on the portside CBM (Common Berthing Module) of Node 1 “Unity” and its partial outfitting, transferring the P6 truss segment from its present place on the Z1 truss to the P5 truss, and a DTO (Development Test Objective) session in the Shuttle cargo bay to test the T-RAD (Tile Repair Ablator Dispenser) system using STA-54 material, similar to a caulk gun.]*

Preparatory to reviewing the Robotics operations required during the 10A docked period, Dr. Whitson connected the UOP DCP (utility outlet panel/display & control panel) power bypass cable for powering up the CUP RWS (Cupola Robotics Work Station) and Lab RWS. Afterwards, Peggy and Clay Anderson performed the usual DOUG (Dynamic Onboard Ubiquitous Graphics) software review before SSRMS (Space Station Remote Manipulator System) activities. DOUG setup for FD3 (OBSS Grapple, Node Unberth & Handoff, EVA-1 setup) is scheduled on FD2. Crewmembers operating the SRMS (Shuttle Remote Manipulator System) and SSRMS will be Clay Anderson, Stephanie Wilson, Dan Tani, Peggy Whitson and Pam Melroy. *[DOUG is a special application running on the MSS (Mobile Service System) RWS laptops that provides a graphical birdseye-view image of the external station configuration and the SSRMS arm, showing its real-time location and configuration on a laptop during its operation.]*

Yurchikhin had ~55 min reserved for stowing hardware designated for disposal in the Soyuz 14S Orbital Module. Later, Kotov transferred prepacked return cargo to the Soyuz for stowage in the spacecraft's Descent Module.

Yuri Malenchenko undertook another standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, his third, using DCS-760 digital still cameras in the SM, today taking photos of an Orbiter cut-out as practice of the bottomside mapping of the Discovery, using the 400mm & 800mm telephoto lenses. Afterwards, Yuri downlinked the obtained images to the ground for analysis, to be discussed at a subsequent tagup. *[The skill training prepares crewmembers for the bottomside mapping of the Orbiter at the arrival of STS-120/10A next week. During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Atlantis from SM windows 6 & 8, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

Clay Anderson conducted the routine maintenance of the SOZh (ECLSS/ Environment Control & Life Support System) in the SM, including ASU toilet facilities systems/replaceables.

Later, Peggy Whitson worked on the IMS (Inventory Management System), updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The FE-2 performed computer maintenance, doing the regular bi-weekly reboots of the SSC (Station Support Computer) File Server and OCA Comm Router laptops as

well as the weekly reboots of the PCS (Portable Computer System) A31p laptops.

For the SAMPLE experiment, Oleg performed the periodic culture sampling and later in a second session became the subject when Yuri collected specimens from him. All samples were secured in the MELFI (Minus Eighty Degree Celsius Laboratory Freezer for ISS). *[Dewar 4 Tray C, Sect. 2/3.]*

In the morning right after wakeup, Malenchenko terminated the new Russian SONOKARD (Sonocard) experiment by taking the recording device from his SONOKARD T-Shirt. Later, Yuri copied the measurements to the RSE-MED laptop for subsequent downlink to the ground. *[SONOKARD is an interesting experiment for potentially improving the crew health monitoring system by using a **contactless** method of acquiring physiological data during the crewmember's sleep. The method employs a device in a breast pocket of a Sonokard sports shirt, with the objectives to (1) study the feasibility of obtaining the maximum of data through computer processing of records obtained overnight, (2) systematically record the crewmember's physiological functions during sleep, (3) study the feasibility of obtaining real-time crew health data. Contactless acquisition of cardiorespiratory data over the night period could serve as a basis for developing efficient criteria for evaluating and predicting adaptive capability of human body in long-duration space flight. This would be important not only from scientific, but also from a practical standpoint for the further development of the system for real-time crew health monitoring. Such a system may become an important element in manned space flight safety, since it will allow a continuous monitoring of crew health. In addition, continuous records of sets of physiological data will permit to gather new information about the state of different levels of physiological functions control, of their co-ordination, and the way they are related to the degree of the body's adaptation to zero-gravity.]*

Other major science activities in the RS by Fyodor, Oleg and Yuri today focused on

—

- PGB (Portable Glovebox) teardown and stowage,
- KUBIK-1 refrigerator (setup & copy data to laptop, switch data cable, copy data again, then perform close-out operations and deactivate the refrigerator),
- CONJUGATION/Pairing experiment (again replacing cold packs in the Biocont-T container in the morning and evening to preserve samples),
- LACTOLEN, ARIL (transfer BIOEKOLOGIYA/Bioecology containers #6-1 & #18 to Soyuz for return),
- BIOTREK (dismantle & transfer container to Soyuz), and
- ANTIGEN (dismantle & transfer containers #13 & #16 to Soyuz).

Sheikh Shukor, the SFP (Space Flight Participant), had his two daily tagups with his

consultant team at TsUP-Moscow via VHF-1 and performed his eighth day of VC-13 activities, making his scheduled daily entries in the log/questionnaires for the MOP (Motion Perception, study of vestibular adaptation to gravity transition) and MUSCLE/LBP (Low Back Pain) experiments.

In addition, Muszaphar Shukor conducted more HDTV photo/video operations of “Life on the Station”, the “Malaysian Science Program on ISS RS”, and scenes of the Malaysian “angkasa” (astronaut) at work.

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR/full time, FE-1/full time, FE-2) and RED resistive exerciser (CDR-16, FE-2).

Afterwards, Peggy copied the crewmembers’ workout data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

At ~12:25pm, Yurchikhin and Malenchenko signed the usual formal Russian statements certifying RS handover/acceptance as specified in the RPS (handover) book, proper transfer of emergency procedures documents and placement of the Iridium/Motorola-9505 satellite phone in the Soyuz Descent Module, as well as the list of cargo stowed on Progress M-61/26P for deorbit.

Later, at ~2:15pm, the combined ISS crews conducted their traditional Changing-of-Command ceremony, as Expedition 15 (Fyodor Yurchikhin, Oleg Kotov) turned ISS operations over to Expedition 16 (Peggy Whitson, Yuri Malenchenko, Clay Anderson). The brief ceremony was transmitted to the ground via Ku- & S-band for broadcast on NASA TV. As usual, the form of the traditional event, which celebrates and commemorates the transition between station crews, was at the crew’s discretion. With this, stewardship of the space station is officially transferred to the new crew.

At ~3:30pm, Clay will have a private CDE (Crew Discretionary Event) via S-band for audio and Ku for video.

*Oxygen Repress Update:* O<sub>2</sub> gas remaining in Progress M-61/26P is currently being used for daily cabin air refreshes as required to maintain proper ppO<sub>2</sub> (O<sub>2</sub> partial pressure). At the same time, the Russian Elektron electrolysis system is also supplying O<sub>2</sub>.

*ISS/RS (Russian Segment) Experiment Plans:* During the new Increment 16, the Russian partner plans to conduct 216 sessions of 48 experiments. Thirty nine experiments have been started during the previous increments. Nine experiments are new investigations (Sonocard, Lactolen, ARIL, OChB, Astrovakcina, Zhenshen-2, Bar, MATI-75, JAXA 3DPC-2).

*Soyuz 14S Return to Earth:* If everything is nominal, the return to Earth of the TMA-10 spacecraft with Yurchikhin, Kotov and Shukor on 10/21 (Sunday) will proceed along the following approximate event sequence (all times EDT; *revised*):

- ISS attitude control handover to RS --- 1:30am;
- ISS in free drift --- 3:10-3:19am;
- Hooks Open command --- 3:11am; automatic undocking from SM on DO15;
- Separation springs action (delta-V ~0.12 m/sec) --- 3:14pm; (retrograde to ISS flight)
- Manual separation burn (15 sec, ~0.65 m/sec) --- 3:17am;
- ISS attitude control handover to US --- 4:10am;
- Deorbit Burn start (delta-V 115.2 m/sec) --- 5:47:07am (115.2 m/s);
- Deorbit Burn complete --- 5:51:28am
- Tri-Module separation (140.1 km) --- 6:11:25am;
- Atmospheric entry (101.8 km, with ~170 m/sec) --- 6:14:15am;
- Max G-load --- 6:20:47am;
- Parachute deploy command --- 6:22:39am;
- 14S Landing --- 6:37:03am EDT; 4:37:03pm local Kazakhstan time;
- Local Sunset --- 8:27am (6:27pm local).

*[Note: Kazakhstan time is GMT+6h; EDT+10h.]*

Today's CEO (Crew Earth Observation) photo targets were **Mt. Kilimanjaro, Kenya** (*Kilimanjaro rises 4,600 m from its base and lies on the eastern branch of the Africa Rift Valley. Kilimanjaro is probably most famous for reports on the melting of the glaciers at its peak. Previous estimates were that all the glaciers would disappear by 2015. Other researchers have proposed that Kilimanjaro is returning to a previous state 11,000 years ago. Still others maintain that the glaciers are not melting because of global warming but because of solar radiation (Philip Mote of the University of Washington, Georg Kaser of the University of Innsbruck). Requested was photo documentation of the ice at the summit of Kilimanjaro*), and **Lake Poopo, Bolivia** (*lowering and rising of water levels in Lake Poopo give indications of short-term regional climate fluctuations. Lake Poopo is a large saline lake located in a shallow depression in the Altiplano Mountains in Bolivia. The water level in this lake is highly variable because it lacks any major outlet and it has a mean depth of no more than 3 m. Therefore, even small regional climate variations can have an impact on the appearance of the lake. There has been recent rain in the area*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:35am EDT [= epoch]):

Mean altitude -- 342.4 km  
Apogee height -- 344.3 km  
Perigee height -- 340.4 km  
Period -- 91.38 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0002932  
Solar Beta Angle -- -24.1 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.76  
Mean altitude loss in the last 24 hours -- 65 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 51039

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:14am/6:38am)

10/23/07 -- STS-120/Discovery/10A **launch** -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5 (11:38am EDT)

10/25/07 -- STS-120/Discovery/10A **docking** (FD3/8:35am EDT) 5 EVAs, incl. Node 2 & PMA-2 external preps)

- 10/26 (FD4) -- EVA-1 (6:28am-1:08pm; Parazynski/Wheelock)
- 10/26 (FE4) -- Node 2 install onto Node 1 (~12:33pm)
- 10/28 (FD6) -- EVA-2 (5:58am-12:38pm; Parazynski/Tani)
- 10/28 (FD6) -- P6 remove from Z1 truss (~8:13am)
- 10/30 (FD8) -- EVA-3 (5:28am-12:38pm; Parazynski/Wheelock)
- 10/30 (FD8) -- P6 install on P5 truss (~6:03am)
- 11/01 (FD10) -- EVA-4 (4:28am-9:13am; Parazynski/Wheelock)
- 11/02 (FD11) -- EVA-5 (3:58am-10:38am; Whitson/Malenchenko)

11/04/07 -- STS-120/Discovery/10A **undocking** (FD13/1:34am)

11/04/07 -- 2:00am: DST ends, ST begins

11/06/07 -- STS-120/Discovery/10A deorbit burn 3:47am EST

11/06/07 -- STS-120/Discovery/10A **landing** @ KSC (FD15/4:50am EST)

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/18/07  
**Date:** Thursday, October 18, 2007 2:10:52 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/18/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 7 of joint E15/E16 operations. Day 195 in space for Yurchikhin & Kotov, Day 133 for Anderson.*

Aboard ISS, the E15/E16 crew rotation/handover period continues with full activity schedules for all six residents involved.

FE-1 Oleg Kotov and FE-1-16 Yuri Malenchenko had about 85 min. of dedicated handover time between them. In addition, there were "generic" handovers where crewmembers are scheduled together to complete various designated standard tasks.

CDR-16 Peggy Whitson and FE-2 Clay Anderson spent 3 hrs in the U.S. Airlock (A/L) to prepare for the 10A spacewalks by gathering and configuring EVA equipment & tools, going by an uplinked list of 62 individual items such as bags, caddies, tethers, etc. Part of the activities also involved verification of configuration and health status of LAS (Load Alleviation Strap) sheaths on safety and waist tethers. *[During recent destructive load testing of an LAS on the ground, the strap failed to show the red warning indicator. Today's inspection was to ensure that all tethers currently on-orbit are "GO" for EVA.]*

Later in the day, Anderson had time reserved for recording video in the A/L, shooting a 20-min tour of the interior of "Quest" for ground viewing.

Fyodor Yurchikhin and Oleg Kotov performed the second (of three) 1.5-hour "installment" of their fifth and final training session in the "Chibis" ODNT suit as standard preparation of cosmonauts for returning into gravity, assisting each other in turn as CMO (Crew Medical Officer) during their individual 90-min runs. Vital body readings were downlinked to RGS (Russian Ground Site) via VHF at 6:41am EDT on DO1 (Daily Orbit 1) & 8:14am on DO2 and also obtained with the

Tenzoplus sphygmomanometer. A tagup/calldown with ground specialists via VHF supported the runs. There will be one more session tomorrow. *[The below-the-waist reduced-pressure device ODNT (US: LBNP, Lower Body Negative Pressure) in the "Chibis" garment provides gravity-simulating stress to the body's cardiovascular/circulatory system for reestablishing the body's orthostatic tolerance (e.g., the Gauer-Henry reflex) after the six-month stay in zero-G. Fyodor's and Oleg's ODNT protocol today again consisted of first imbibing 150-200 milliliters of water or juice, followed by a sequence of progressive regimes of reduced ("negative") pressure, set at -25, -30, -35 and -40 mmHg for five minutes each, then at -25, -30, and -40 mmHg, 10 minutes in each mode, and at -30 mmHg for 5 min, while shifting from foot to foot at 10-12 steps per minute. The body's circulatory system interprets the pressure differential between upper and lower body as a gravity-like force pulling the blood and body fluids "down".]*

Peggy Whitson unstowed and set up the NUTRITION with Repository hardware for the blood draw and urine collection part of her first session with the NUTRITION experiment, beginning tomorrow, requiring Peggy to forego exercising & food intake for eight hours, i.e., starting tonight. Urine sample collection begins tomorrow morning and continues through Saturday morning. *[The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts, collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing in-flight samples (plus an additional postflight sample), made possible by the MELFI/Minus Eighty Degree Celsius Laboratory Freezer for ISS].*

CDR Yurchikhin used standard ECOSFERA equipment, set up yesterday, to perform microbial air sampling runs for the MedOps SZM-MO-21 experiment, taking samples in the DC-1 Docking Compartment, followed by the standard pre-return sanitary-epidemiological incubation status checks (MedOps SZM-MO-22), collecting samples from cabin surfaces along with specimens from crewmembers for sanitation and disease studies. The samples will be returned to Earth on Soyuz. *[The MO-21 equipment, consisting of an air sampler set, a charger and power supply unit, provides samples to help determine microbial contamination of the ISS atmosphere, specifically the total bacterial and fungal microflora counts and microflora composition according to morphologic criteria of microorganism colonies. The MO-22 equipment, similar to MO-21, complements the investigation.]*

Fyodor also collected the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Crewmembers Anderson & Whitson, as part of handover activity, conducted the weekly 10-min. CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water callowns are sent up every other week.]*

Yuri Malenchenko completed the (currently) daily job of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- and FGB-to-Soyuz tunnels, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

Peggy & Clay had an hour set aside on their timeline for reviewing a draft copy of the STS-120/10A Resupply Transfer List, an 11-page first cut at the equipment transfers required during the 10A docked period, with quantities of items, initial & final stowage locations, masses, and procedures/constraints.

Yurchikhin & Kotov transferred and stowed return cargo in Soyuz TMA-10/14S, working their way through an extensive 6-page equipment list.

Clay Anderson conducted the routine maintenance of the SOZh (ECLSS/ Environment Control & Life Support System) in the SM, including ASU toilet facilities systems/replaceables. *[Due to a failure of the ASU last night, crewmembers were advised by TsUP-Moscow to use the ASU in the Soyuz spacecraft in the interim until restoration of the SM facility to full operation.]*

Later, Peggy Whitson worked on the IMS (Inventory Management System), updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The CDR-16 continued the close-out of SAME (Smoke Aerosol Measurement Experiment), started yesterday by Anderson, first removing the numerous SAME hardware pieces from the MSG WV (Microgravity Science Glovebox/Work Volume) to intermediate stowage, then reconfiguring the MSG rack for the CSLM-2 (Coarsening in Solid-Liquid Mixtures-2) hardware scheduled next week for setup. While the ground did some checkout of the MSG LAN (Local Area Network) configuration, Dr. Whitson repacked the SAME gear for return to Earth and finally deactivated the MSG. *[SAME measured the smoke properties, or particle size distribution, of typical particles that are produced from different materials that can be found onboard ISS and other spacecraft. SAME also tested the performance of ionization smoke detectors (currently in use on Space Shuttles) and evaluated the performance of the photoelectric smoke detectors (currently in use on ISS). The data will be used to develop a model that can predict smoke properties in space*

*and to develop smoke detection requirements for Orion, the next generation crew exploration vehicle.]*

The three Russian crewmembers worked on the extensive Matryoshka-R radiation monitoring payload, from which Kotov first removed the 25P-delivered differential pressure indicator/dosimeter assemblies (SPD) for return on Soyuz 14S, followed by Yurchikhin and Malenchenko transferring a new set of TLD detectors and NTDP assemblies from 14S and placing them in the Matryoshka's Anthropomorphic Phantom in the SM. *[The complex Matryoshka payload suite is designed for sophisticated radiation studies. Besides spherical containers in the SM, there is the "Phantom", a human dummy torso assembled from individual horizontal slice-like (body cross-sectional) layers with 356 thermo-luminescent detectors (TLDs) and five nuclear radiation tracking detectors (NTDPs) between the layers. After the insertion of the detectors and re-assembly of the mannequin, the torso is "dressed" with a covering "poncho" and "hood" and used for studies of on-orbit radiation and long-term dose accumulation. The payload collects radiation measurements every 15 minutes of each hour around the clock. Note: Matryoshka is the name for the traditional Russian set of nested dolls.]*

Other major science activities in the RS (Russian Segment) by Fyodor, Oleg and Yuri today focused on –

- AT-Space (transfer of containers from KUBIK-1 refrigerator to BKT1 kit),
- BIORISK (BIO-2; KM tray dismantling & transfer to Soyuz, -MCB container #7 transfer to Soyuz),
- BIOEKOLOGIYA/Bioecology (BTKh-12; Kit #10 removal from Bioecology Kit #3 and transfer to Soyuz),
- CONJUGATION (Pairing) experiment (again replacing cold packs in the Biocont-T container in the morning and evening to preserve samples), and
- Recording all activities for photo/video documentation.

In addition, Malenchenko set up the new Russian SONOKARD (Sonocard) payload and started the experiment, using T-Shirt 1-02 from the SONOKARD kit.

Measurements are recorded on a data card for return to Earth. *[SONOKARD is an interesting experiment for potentially improving the crew health monitoring system by using a **contactless** method of acquiring physiological data during the crewmember's sleep. The method employs a device in a breast pocket of a Sonokard sports shirt, with the objectives to (1) study the feasibility of obtaining the maximum of data through computer processing of records obtained overnight, (2) systematically record the crewmember's physiological functions during sleep, (3) study the feasibility of obtaining real-time crew health data. Contactless acquisition of cardiorespiratory data over the night period could serve as a basis for developing efficient criteria for evaluating and predicting adaptive capability of human body in long-duration space flight. This would be important not only from scientific, but also*

*from a practical standpoint for the further development of the system for real-time crew health monitoring. Such a system may become an important element in manned space flight safety, since it will allow a continuous monitoring of crew health. In addition, continuous records of sets of physiological data will permit to gather new information about the state of different levels of physiological functions control, of their co-ordination, and the way they are related to the degree of the body's adaptation to zero-gravity.]*

Dr. Sheikh Shukor, the SFP (Space Flight Participant), had his two daily tagups with his consultant team at TsUP-Moscow via VHF-1 and performed his seventh day of VC-13 activities, making his scheduled daily entries in the log/questionnaires for the MOP (Motion Perception, study of vestibular adaptation to gravity transition) and MUSCLE/LBP (Low Back Pain) experiments.

VC-13 also assisted Yuri Malenchenko in a session of the ETD (Eye Tracking Device) experiment in the DC-1, first with target installation, distance measuring and making hardware connections, later by taking photo documentation of Yuri's experimental session on a flash/memory card for subsequent downlinking to the ground.

In addition, Muszaphar Shukor conducted more HDTV photo/video operations of "Life on the Station", the "Malaysian Science Program on ISS RS", scenes of the Malaysian "angkasa" (astronaut) using the Russian UFS Operator Restraint System and a "Virtual 3D-Manual for the Angkasa" on the laptop.

At 11:35am EDT, the SFP held a ham radio session on the Kenwood equipment in the SM with students of Malaysian Group of Schools #4 at the National Planetarium in Kuala Lumpur. [*"How does one get treated for sudden sickness in space?"; "Is there anything interesting that you have learned so far?"; "How hard is it to change your clothes in space?"; "Can you watch your favorite soap in space?"; "What language do you use to communicate between your fellow crew?"*]

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR-16, FE-1/full time) and RED resistive exerciser (FE-2, FE-1-16), with CDR & FE-1 also putting in exercise as part of their Chibis LBNP/ODNT sessions.

Afterwards, Clay copied the crewmembers' workout data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary “time permitting” task list, Oleg conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

At ~10:30am, CDR-16 Whitson and FE-2 Anderson supported two televised PAO interviews of 10 min each, one with the space.com website (Tariq Malik), the other with The Daily Nebraskan (Katie Steiner).

At ~2:45pm, Peggy & Clay had 30 min set aside for a teleconference with ground specialists to discuss 10A Shuttle prepack activities.

At ~4:40pm, Clay will also have his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

*Oxygen Repress Update:* O<sub>2</sub> gas remaining in Progress M-61/26P is currently being used for daily cabin air refreshes as required to maintain proper ppO<sub>2</sub> (O<sub>2</sub> partial pressure). At the same time, the Russian Elektron electrolysis system is also supplying O<sub>2</sub>.

*ISS/RS (Russian Segment) Experiment Plans:* During the new Increment 16, the Russian partner plans to conduct 216 sessions of 48 experiments. Thirty nine experiments have been started during the previous increments. Nine experiments are new investigations (Sonocard, Lactolen, ARIL, OChB, Astrovakcina, Zhenshen-2, Bar, MATI-75, JAXA 3DPC-2).

*ATU Lockup Issue:* Yesterday, according to crew report ATU-6 (Audio Terminal Unit 6) in the US Airlock was “frozen” and could not be reconfigured or set to Transmit. After cycling the unit out & back into Public Calls mode, the ATU is functioning intermittently. Specialists are investigating.

*Soyuz 14S Return to Earth:* If everything is nominal, the return to Earth of the TMA-10 spacecraft with Yurchikhin, Kotov and Shukor on 10/21 (Sunday) will proceed along the following approximate event sequence (all times EDT; *revised*):

- ISS attitude control handover to RS --- 1:30am;
- ISS in free drift --- 3:10-3:19am;
- Hooks Open command --- 3:11am; automatic undocking from SM on DO15;
- Separation springs action (delta-V ~0.12 m/sec) --- 3:14pm; (retrograde to ISS flight)

- Manual separation burn (15 sec, ~0.65 m/sec) --- 3:17am;
- ISS attitude control handover to US --- 4:10am;
- Deorbit Burn start (delta-V 115.2 m/sec) --- 5:47:07am (115.2 m/s);
- Deorbit Burn complete --- 5:51:28am
- Tri-Module separation (140.1 km) --- 6:11:25am;
- Atmospheric entry (101.8 km, with ~170 m/sec) --- 6:14:15am;
- Max G-load --- 6:20:47am;
- Parachute deploy command --- 6:22:39am;
- 14S Landing --- 6:37:03am EDT; 4:37:03pm local Kazakhstan time;
- Local Sunset --- 8:27am (6:27pm local).

[Note: Kazakhstan time is GMT+6h; EDT+10h.]

Today's CEO (Crew Earth Observation) photo targets were **Eastern Tien Shan, China** (*glaciers on the crests of the Tien Shan ranges are being monitored by global change scientists as examples of lower latitude glaciers. Continental glaciers on high mountains hold a different history of environmental change than coastal glaciers. Crew was asked to shoot glacier tongues of the Tien Shan range. ISS orbit passed over the center of this range*), and **Oasis Impact Crater** (*Oasis impact crater is 18 km in diameter and is dated at less than 120 million years. CEO team has a few images of this crater taken with the 400 mm lens but no sharply focused views with the 800 mm lens. Thus, the crew was requested to acquire this image using the 800 mm telephoto lens*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 9:50am EDT [= epoch]):

Mean altitude -- 342.4 km

Apogee height -- 344.4 km

Perigee height -- 340.4 km

Period -- 91.38 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0002989

Solar Beta Angle -- -19.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 88 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 51024

**Significant Events Ahead** *(all dates Eastern, some changes possible):*

- 10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:14am/6:38am)
- 10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5 (11:38am EDT)
- 10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)
- 11/03/07 -- STS-120/Discovery/10A undocking
- 11/06/07 -- STS-120/Discovery/10A landing @ KSC (4:47am EST)
- 11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)
- 11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab
- 11/14/07 -- US EVA-10
- 11/18/07 -- US EVA-11
- 12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite
- 12/08/07 -- STS-122/Atlantis/1E docking
- 12/15/07 -- STS-122/Atlantis/1E undocking
- 12/22/07 -- Progress M-61/26P undocking (DC1) & reentry
- 12/23/07 -- Progress M-62/27P launch
- 12/25/07 -- Progress M-62/27P docking (DC1)
- 01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)
- 01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**
- 02/06/08 -- Progress M-62/27P undocking
- 02/07/08 -- Progress M-63/28P launch
- 02/09/08 -- Progress M-63/28P docking
- 02/14/08 -- ATV-1 docking (SM aft port)
- 02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS
- 02/16/08 -- STS-123/Endeavour/1J/A docking
- 02/27/08 -- STS-123/Endeavour/1J/A undocking
- 04/08/08 -- Soyuz TMA-12/16S launch
- 04/10/08 -- Soyuz TMA-12/16S docking (DC1)
- 04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)
- 04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)
- 04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.
- 04/26/08 -- STS-124/Discovery/1J docking
- 05/02/08 -- STS-124/Discovery/1J undocking
- 05/14/08 -- Progress M-64/29P launch
- 05/16/08 -- Progress M-64/29P docking (DC1)
- 07/29/08 -- ATV-1 undocking (from SM aft port)
- 08/11/08 -- Progress M-64/29P undocking (from DC1)
- 08/12/08 -- Progress M-65/30P launch
- 08/14/08 -- Progress M-65/30P docking (SM aft port)
- 09/13/08 -- Progress M-66/31P launch
- 09/15/08 -- Progress M-66/31P docking (DC1)

09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch.**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/17/07  
**Date:** Wednesday, October 17, 2007 2:50:50 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/17/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 6 of joint E15/E16 operations. Day 194 in space for Yurchikhin & Kotov, Day 132 for Anderson.*

Aboard ISS, the E15/E16 crew rotation/handover period continues with full activity schedules for all six residents involved.

CDR Fyodor Yurchikhin and FE-1-16 Yuri Malenchenko had about 60 min. of dedicated handover time between them. In addition, there were “generic” handovers where crewmembers are scheduled together to complete various designated standard tasks.

Yurchikhin, FE-1 Kotov and SFP Sheik Shukor spent three hours in the TMA-10 Descent Module (SA) to conduct the Soyuz descent drill, a standard training exercise for every crew returning on a Soyuz. The exercise, which strictly forbids any command activation (except for switching the InPU display), was supported by a tagup and discussions with ground instructor at TsUP/Moscow via S-band. *[The session includes a review of the pertinent ODFs (operational data files), specifically the books on Soyuz Ascent & Descent Procedures, Emergency Descents, and Off-Nominal Situations, crew responsibilities when executing the flight program, visual crew recognition of SUS (Entry Control System) failures, spacesuit procedures, etc., with special emphasis on operations with the Neptune-ME cockpit console. The training uses a Descent Simulator application on the RSK1 laptop. During the actual descent, Yurchikhin, as Soyuz CDR, will occupy the middle couch, with Shukor in the right seat and Kotov in the Descent Module’s left Kazbek couch. Pending the final State Commission decision at about 3.5h before undocking, 14S return is expected for 10/21 (next Sunday), with undocking at 3:14am EDT and landing near Arkalyk/Kazakhstan at ~6:38am (4:38pm Kazakhstan time). See below for details.]*

CDR-16 Peggy Whitson started her day by setting up the SAFER OBT (Simplified Aid for EVA Rescue Onboard Trainer) on an A31p laptop, reviewed procedures and then spent about three hours practicing flying on the SAFER as preparation for her 10A spacewalk (EVA-5 on STS-120 Flight Day 11). Afterwards, the SAFER was stowed again.

Later, Whitson and Malenchenko continued preparations for the 10A EVAs in the U. S. Airlock (A/L) for several hours. Specifically, Peggy and Yuri –

- Familiarized themselves with the EMU C&W (Extravehicular Mobility Unit Caution & Warning) system,
- Checked out their EMU/spacesuits,
- Terminated charging of the second EVA battery set in the BSA (Battery Stowage Assembly),
- Checked out the SAFER units,
- Installed the REBAs (Rechargeable EVA Battery Assemblies) in the EMUs,
- Checked out the REBA powered suit equipment and tools (EVA tool preparation is scheduled tomorrow), and
- Went through a review and drill of the procedures for aiding a crewmate incapacitated by decompression sickness and for using the BTA (Bends Treatment Adapter) hardware.

In preparation for the arrival of the Discovery next week (10/25, Thursday), FE-2 Anderson worked with three DCS-760 digital cameras (#1017, #1013, #1016), taking blank and white images with each on a PCMCIA 1GB microdrive. *[After their downlink to MCC-Houston, the images will be analyzed to determine which two of the 760s to use for the STS-120 RPM (R-bar Pitch Maneuver) photography.]*

Time again for one last recharge of the Motorola-9505 Iridium satellite phone to be returned with Soyuz 14S, a monthly routine job. CDR Yurchikhin, with FE-1-16 Malenchenko monitoring, took care of the recharge, completing the process and cleaning up at about 1:00pm EDT. *[After retrieving it from its location in the Soyuz TMA-10/14S descent module (BO), Fyodor and Yuri initiated the recharging of its lithium-ion battery, monitoring the process every 10-15 minutes as it took place. Upon completion, the phone was returned inside its SSSP Iridium kit and stowed it back in the BO's operational data files (ODF) container. The satphone accompanies returning ISS crews on Soyuz reentry & landing for contingency communications with SAR (Search-and-Rescue) personnel after touchdown. The Russian-developed procedure for the monthly recharging has been approved jointly by safety officials. During the procedure, the phone is left in its fire-protective fluoroplastic bag with open flap.]*

Oleg Kotov took the monthly sensor readings of the Russian "Pille-MKS" radiation dosimetry experiment, which has ten sensors placed at various locations in the

Russian segment (port cabin window, starboard cabin window, ASU toilet facility, control panel, etc.), then powering down the reader and replacing the flash card, afterwards stowing the removed memory card for return to Earth on 14S.

Malenchenko conducted the currently daily job of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- and FGB-to-Soyuz tunnels, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

In support of upcoming payload data transferring from the BSPN payload server for subsequent downlink on OCA comm (via the Russian RSS1 laptop to a PCMCIA flash card), Yuri performed the periodic time synchronization between the RSS1 and the BSPN, after testing functionality by checking data comm between the two computers and synching RSS1 to station time. *[Experiment control application is a payload file transfer program called ShellForKE.]*

The FE-1 serviced the Service Module (SM) condensate water processor (SRV-K2M) system, replacing the BKV water conditioning unit's BKO multifiltration/purification column with a new spare. The old unit was pre-packed for disposal. *[The SRV-K2M, with its BKO multifiltration unit, removes dissolved mineral and organic impurities from the condensate. Downstream from it, the condensate water is treated in the BKV water conditioning unit with salts for taste and silver ions for preservation, before it flows to the KPV potable water container.]*

Clay Anderson offloaded the Lab CCAA (Common Cabin Air Assembly) dehumidifier's condensate tank, filling a CWC (#1062) with the collected water slated for processing. *[Estimated offload time before termination (leaving ~5.25 kg in the tank): ~23 min.]*

Afterwards, Yurchikhin and Malenchenko took the CWC #1062 to the Russian Segment (RS) for the periodic (about twice a month) replenishing of the Elektron oxygen generator's water supply for electrolysis, filling the KOV thermal loops' EDV container. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Whitson conducted the regular checkout of the HMS RSP (Health Maintenance System/Respiratory Support Pack).

Peggy also did the periodic check of running U.S. payloads, i.e., cleaning the ANITA (Analyzing Interferometer for Ambient Air) inlet and inspecting & filter cleaning of the CGBA-5 (Commercial Generic Bioprocessing Apparatus 5)

incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to Earth.]*

The FE-2 closed out the SAME (Smoke Aerosol Measurement Experiment) investigation which recently completed operations with excellent results. Final steps today consisted of powering up the MSG (Microgravity Science Glovebox) facility and removing the last sample carousel. *[Except for the alcohol wick, all items will be returned to Earth on 10A, including the thermal precipitator and digital video tapes. SAME measured the smoke properties, or particle size distribution, of typical particles that are produced from different materials that can be found onboard ISS and other spacecraft. SAME also tested the performance of ionization smoke detectors (currently in use on Space Shuttles) and evaluated the performance of the photoelectric smoke detectors (currently in use on ISS). The data will be used to develop a model that can predict smoke properties in space and to develop smoke detection requirements for Orion, the next generation crew exploration vehicle.]*

Yuri downlinked the data accumulated during Increment 15 in the RS by the ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) experiment that Fyodor closed down yesterday. Space radiation spectrometry data were sent to Earth via U.S. OCA assets from two PCMCIA memory cards, #935 & #939 (which also will be returned on Soyuz 14S).

Other major science activities in the RS by Yuri Malenchenko today focused on –

- KUBIK-2 refrigerator (set-up & copying data, then switching its data cable and copying data again, followed by deactivation of thermostat and closing out the equipment,
- AT-Space experiment (finishing by fixating containers 1 thru 6 {#4 in PGB/ Portable Glovebox}), and
- CONJUGATION (Pairing) experiment, again replacing cold packs in the Biocont-T container in the morning and evening to preserve samples.

In preparation for a microbial air sampling session scheduled tomorrow, CDR Yurchikhin unstowed the MedOps SZM-MO-21 ECOSFERA equipment and initiated charging on the Ecosphere power pack (BP). *[The equipment, consisting of an air sampler set, a charger, power supply unit, and incubation tray for Petri dishes, determines microbial contamination of the ISS atmosphere, specifically the total bacterial and fungal microflora counts and microflora composition according to morphologic criteria of microorganism colonies.]*

Besides participating in the Soyuz descent OBT, SFP (Space Flight Participant) Dr. Shukor had his two daily tagups with his consultant team at TsUP-Moscow via VHF-1 and performed his sixth day of VC-13 activities, making his scheduled daily

entries in the log/questionnaires for the MOP (Motion Perception, study of vestibular adaptation to gravity transition) and MUSCLE/LBP (Low Back Pain) experiments, and conducting the ETD (Eye Tracking Device) experiment of the VC-13 program, with Malenchenko again supporting him with photo documentation.

Shukor also conducted more HDTV photo/video operations of “Life on the Station”, the “Malaysian Science Program on ISS RS”, scenes of the Malaysian “angkasa” (astronaut) using the Russian UFS Operator Restraint System and a “Virtual 3D-Manual for the Angkasa” on the laptop.

Oleg Kotov conducted the routine maintenance of the SOZh (ECLSS/Environment Control & Life Support System) in the SM, including ASU toilet facilities systems/replaceables.

Later, Yuri Malenchenko worked on the IMS (Inventory Management System), updating/editing its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The E15 crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR/full time, FE-1/full time) and RED resistive exerciser (FE-2). CDR-16 Whitson also performed her second workout today, on RED (1 hr).

Later tonight, Peggy will transfer the crewmembers’ exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

At ~9:35am, the E-16 crewmembers (Whitson, Malenchenko, Anderson) held a teleconference with the STS-120/10A crew to discuss details of next week’s 10A docking mission.

Afterwards (~11:15am), the E-15/E-16 crews shared in two televised PAO interviews of 10 min each, one with CBS News (Kimberly Dozier), the other with ABC News (Gina Sunseri).

*Oxygen Repress Update:* O<sub>2</sub> gas remaining in Progress M-61/26P is currently being used for daily cabin air refreshes as required to maintain proper ppO<sub>2</sub> (O<sub>2</sub> partial pressure). At the same time, the Russian Elektron electrolysis system is also supplying O<sub>2</sub>.

*Soyuz 14S Return to Earth:* If everything is nominal, the return to Earth of the TMA-10 spacecraft with Yurchikhin, Kotov and Shukor on 10/21 (Sunday) will proceed along the following approximate event sequence (all times EDT):

- ISS attitude handover to RS --- 1:30am;
- ISS in free drift --- 3:10-3:19am;
- Hooks Open command --- 3:11am; automatic undocking from SM on DO15;
- Separation springs action (delta-V ~0.12 m/sec) --- 3:14pm; (retrograde to ISS flight)
- Manual separation burn (15 sec, ~0.65 m/sec) --- 3:17am;
- Deorbit Burn start (delta-V 115.2 m/sec) --- 5:47:17am;
- Deorbit Burn complete --- 5:51:39am
- Tri-Module separation (140.1 km) --- 8:05:37am;
- Atmospheric entry (101.8 km, with ~170 m/sec) --- 6:14:27am;
- Max G-load --- 6:20am;
- Parachute deploy command --- 6:22:49am;
- ISS attitude control handed back to US --- 4:10am;
- 14S Landing --- 6:37:49am EDT; 4:37:49pm local Kazakhstan time;
- Local Sunset --- 8:26am (6:26pm local).

*[Note: Kazakhstan time is GMT+6h; EDT+10h.]*

### **What will the Soyuz TMA-10/14S crew experience during their reentry/descent?**

For the reentry, Yurchikhin, Kotov and Shukor will wear the Russian Kentavr anti-G suit. *[The Kentavr garment is a protective anti-g suit ensemble to facilitate the return of a long-duration crewmember into the Earth gravity. Consisting of shorts, gaiters, underpants, jersey and socks, it acts as countermeasure for circulatory disturbance, prevents crewmember from overloading during descent and increases orthostatic tolerance during post-flight adaptation. Russian crewmembers are also advised to ingest fluid-electrolyte additives, viz., three sodium chloride tablets during breakfast and after the midday meal, each time with 300 ml of fluid, and two pills during the meal aboard Soyuz before deorbit.]*

#### Before descent:

Special attention will be paid to the need for careful donning of the medical belt with sensors and securing tight contact between sensors and body.

During preparation for descent, before atmosphere reentry, crewmembers settle down comfortably in the Kazbek couches, fasten the belts, securing tight contact between body and the seat liner in the couch.

#### During de-orbit:

Dust particles starting to sink in the Descent Module (SA) cabin is the first indication

of atmosphere reentry and beginning of G-load effect. From that time on, special attention is required as the loads increase rapidly.

Under G-load effect during atmosphere reentry the crew expects the following experience:

*Sensation of G-load pressure on the body, burden in the body, labored breathing and speech. These are normal sensations, and the advice is to "take them coolly". In case of the feeling of a lump in the throat, this is no cause to "be nervous". This is frequent and should not be fought. Best is to "try not to swallow and talk at this moment". Crew should check vision and, if any disturbances occur, create additional tension of abdominal pressure and leg muscles (strain abdomen by pulling in), in addition to the Kentavr anti-G suit.*

During deployment of pilot (0.62 & 4.5 square meters), drogue (16 sq.m.) and main (518 sq.m.) parachutes the impact accelerations will be perceived as a "strong snatch". No reason to become concerned about this but one should be prepared that during the parachutes deployment and change ("rehook") of prime parachute to symmetrical suspension, swinging and spinning motion of the SA occurs, which involves vestibular (middle ear) irritations.

It is important to tighten restrain system to fasten pelvis and pectoral arch. Vestibular irritation can occur in the form of different referred sensations such as vertigo, hyperhidrosis, postural illusions, general discomfort and nausea. To prevent vestibular irritation the crew should "limit head movement and eyes movement", as well as fix their sight on motionless objects.

Just before the landing (softened by six small rocket engines behind the heat shield):

Crew will be prepared for the vehicle impact with the ground, with their bodies fixed along the surface of the seat liner in advance. "Special attention should be paid to arm fixation to avoid the elbow and hand squat" (instruction). Landing speed: ~9.9 m/sec.

After landing:

Crew should not get up quickly from their seats to leave the SA. They were advised to stay in the couch for several minutes and only then stand up. In doing that, they should limit head and eyes movement and avoid excessive motions, proceeding slowly. They and their body should not take up earth gravity in the upright position too quickly.

Today's CEO (Crew Earth Observation) photo targets were **Dundee Ice Cap, China** *(the glaciers in this target area are prominent only on the north slopes on this east-west oriented range. This is a very arid continental region and ice persists at this latitude primarily because of the 16,500 to 17,500 ft elevations of the mountain*

crests. These glaciers are currently under field investigation by Ohio State University where core samples have been taken for paleo-climate studies. Dundee Ice Cap should have been to the left [west] of this ascending orbit pass), **Mt. Kilimanjaro, Kenya** (Kilimanjaro rises 4,600 m from its base and lies on the eastern branch of the Africa Rift Valley. Probably what Kilimanjaro is most famous for recently is the melting of the glaciers at its peak. Previous estimates were that all the glaciers would disappear by 2015. Other researchers have proposed that Kilimanjaro is returning to a previous state of 11,000 years ago. Still others maintain that the glaciers are not melting because of global warming but because of solar radiation [Philip Mote of the University of Washington, Georg Kaser of the University of Innsbruck]. Requested is photo documentation of the ice at the summit of Kilimanjaro), **Ouarkiz Impact Crater** (Ouarkiz impact crater is 3.5 km in diameter and has been dated as less than 70 million years old. While there are 400 mm views of this crater in the CEO database, researchers would like to get more detailed views with the 800 mm lens [400 with doubler]. The crater should have been a little left of orbit track), and **Mt. Ruapehu** (Mt. Ruapehu is an active volcano at the southern end of the Taupo Volcanic Zone in New Zealand. It is located 40 km SW of the southern shore of Lake Taupo. Ruapehu is one of the world's most active volcanoes and the largest active volcano in New Zealand, the most recent major eruptions occurring in 1995 and 1996).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 9:24am EDT [= epoch]):

Mean altitude -- 342.5 km

Apogee height -- 344.6 km

Perigee height -- 340.4 km

Period -- 91.39 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0003091

Solar Beta Angle -- -14.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

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10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- STS-120/Discovery/10A landing @ KSC (4:47am EST)

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

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12/08/07 -- STS-122/Atlantis/1E docking

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12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**

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02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- ATV-1 docking (SM aft port)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour/1J/A undocking

04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)

04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)

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04/26/08 -- STS-124/Discovery/1J docking

05/02/08 -- STS-124/Discovery/1J undocking

05/14/08 -- Progress M-64/29P launch

05/16/08 -- Progress M-64/29P docking (DC1)

07/29/08 -- ATV-1 undocking (from SM aft port)

08/11/08 -- Progress M-64/29P undocking (from DC1)

08/12/08 -- Progress M-65/30P launch

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 10/16/07  
**Date:** Tuesday, October 16, 2007 2:25:51 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/16/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 5 of joint E15/E16 operations. Day 193 in space for Yurchikhin & Kotov, Day 131 for Anderson.*

Aboard ISS, the E15/E16 crew rotation/handover period continues with full activity schedules for all six residents involved.

CDR Yurchikhin, CDR-16 Peggy Whitson, FE-2-16 Clay Anderson, FE-1-15 Oleg Kotov and FE-1-16 Yuri Malenchenko had about 40 min. of dedicated handover time between them. In addition, there were "generic" handovers where crewmembers are scheduled together to complete various designated standard tasks.

Fyodor Yurchikhin also finished Part 2 of his second stress test plus saliva and blood sampling of the ESA/Russian biomed experiment "IMMUNO", today completing remaining urine sample collections and conducting close-out ops. Specimens were stowed in a special urine containment bag in the KRIOGEM-3M refrigerator (blood samples were secured yesterday in the MELFI {Minus Eighty Degree Celsius Laboratory Freezer for ISS} in cold packs). *[IMMUNO is a 24-hr. test of human immune system changes, with the objective to investigate immune neuro-endocrine reactions in the space environment by studying samples of saliva, blood and urine using collection kits and the biomedical (MBI) protection kit. Also included are entries in a fluid/medications intact log, and a stress-test questionnaire to be filled out by the subject at begin and end of the first day, based on the accompanying MO-3 stress test, performed during the subject's physical exercise regimen.]*

After his concluding "IMMUNO" session, Yurchikhin took air samples with the IPD-

NH<sub>3</sub> Draeger tubes sampler, testing for ammonia (NH<sub>3</sub>) in the SM (Service Module), i.e., checking for spilled urine if any.

Yuri Malenchenko and Oleg Kotov set up the work area for the Russian science payload BIMS (MBI-22) and unstowed the hardware. For the subsequent experiment activity, Yuri was the subject, with Oleg (who has been through this before) assisting. Today's runs included otoscopic, nasal, dental and dermatological exams for evaluating the skin and mucous membranes for any changes over long-duration space missions, based on video and digital photography to capture areas of skin, gums, nasal passages and the ear canal.. *[BIMS objective is to conduct several experimental sessions in the RS (Russian segment) for filming skin portions and mucous membranes of crewmembers. It is part of a comprehensive research into using telemedical technologies for getting information from distant space crews for medical support of human space missions and information for life science flight studies. The BIMS experiment uses image capturing (video & still photo), an otoscope (or auriscope - the familiar medical device for visualizing the outer & middle ear, nose and upper throat area), the RSE-med A31p laptop and PCMCIA memory cards, with data files downlink via BSR-TM to study small skin sites, conduct otorhinolaryngologic examinations (external acoustic meatus, eardrums, nasal passages), and do stomatologic (i.e., medical study of mouth and its diseases) examination of gums and teeth.]*

Peggy Whitson spent about 45 min. on the periodic (~monthly) PEP (Portable Emergency Provisions) safety inspection. *[The IMS-supported inspection involves verification that PFEs (portable fire extinguishers), PBAs (portable breathing apparatus), QDMAs (quick-don mask assemblies) and EHTKs (extension hose/tee kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware. In the U.S. segment (USOS), there are a total of 5 PFEs and 7 PBAs, plus 7 QDMAs and 4 EHTKs.]*

Yuri Malenchenko performed IFM (in-flight maintenance) in the GA (Pressurized Adapter) section of the FGB, replacing a drive handle for the transfer hatch seal with a new handle delivered on Soyuz TMA-11/15S in its SSVP (Docking & Internal Transfer System) accessories kit.

In the SM, FE-1-16 Malenchenko conducted part of the periodic water sampling for return to Earth, using empty drinking bags (or food container) to collect condensate (KAV) samples upstream of the Water Purification Column Unit (SRV-K2M BKO). Later, Yuri replaced the water sampler.

Kotov used the SKDS CMS (Pressure Control & Atmosphere Monitoring System/Countermeasure System) to take readings of potentially harmful contaminants in

the SM. The hardware was then returned to initial stowage. *[The CMS uses preprogrammed microchips to measure Formaldehyde (H<sub>2</sub>CO, methanal), Carbon Monoxide (CO) and Ammonia (NH<sub>3</sub>), taking one measurement per microchip.]*

CDR Yurchikhin conducted the currently daily job of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- and FGB-to-Soyuz tunnels, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

As part of handover activities, Malenchenko joined Yurchikhin in the extended leak checking of the spare BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator by measuring its internal pressure, which is being recharged in regular intervals with pressurized N<sub>2</sub> from a BPA Nitrogen Purge Unit. The last test pressurization was done by Yurchikhin on 10/4. *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

Yuri Malenchenko upgraded the Russian RSE-MED laptop with new software (Vers. 1.4) from a DVD disk brought up on Soyuz 15S. *[Before the software installation, data accumulated on the laptop during Increment 15 were temporarily saved on a Flashcard and later restored on the RSE-MED (for the DYKHANIE, PNEVMOKARD, BIMS, CARDIOKASSETA and STIMUL experiments).]*

In the U.S. Airlock (A/L), Peggy Whitson continued preparations for the 10A spacewalks, setting up the SCU (Service & Cooling Umbilical) gear for the standard EMU (Extravehicular Mobility Unit) "scrubbing" and then starting the ionic and particulate filtration process on the EMU and A/L cooling loops, for elimination of any biomaterial residues.

Whitson also installed EMU batteries (#2038, #2077) and METOX canisters (#0007, #0016) in support of the EMU loop scrub and tomorrow's scheduled EMU checkout.

Later, Peggy and Clay configured the EVA systems for use, i.e., preparing the helmets with the Valsalva devices (for nose pinching & ear canal clearing) and Fresnel lenses, installing gloves and the "Snoopy" comm caps for the EMU checkout, plus doing some other get-ahead tasks. *[The two spacesuits (#3006, #3018) for Peggy and Yuri required about one hour each with SCU connected. During the 10A docked period, a total of five spacewalks are planned, to be conducted by Scott Parazynski, Douglas Wheelock, Daniel Tani, Whitson and*

*Malenchenko, including almost three hours of T-RAD (tile repair ablator dispenser) testing by Parazynski and Wheelock in the Shuttle cargo bay.]*

FE-1-16 Malenchenko removed the two passive dosimeters of the Russian BTN-M1 “Neutron” experiment from its BZ electronics box and transferred them to the Soyuz for return to Earth. *[BTN-M1 “Neutron” was installed on 11/23/06 during EVA-17 by Tyurin and Lopez-Alegria on an external handrail. The payload measured the exposure of ISS to neutron and gamma radiation that come from solar flares. Its data are to be used to clarify current on-orbit radiation models and determine the complete radiation dose the astronauts and cosmonauts receive during EVAs.]*

CDR Yurchikhin closed out the current operations of the ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) experiment, collecting its dosimeters and memory cards with data obtained during Increment 15 and prepacking them for return to Earth on Soyuz. Afterwards, Fyodor relocated the AST spectrometer and its hardware accessories to a new exposure location, installing them, along with fresh 15S-delivered dosimeters, in the DC-1 Docking Compartment. *[ALTCRISS uses the AST spectrometer to monitor space radiation in the Russian segment (RS).]*

FE-1 Kotov meanwhile closed out the RS radiation payload suite “Matryoshka-R”, pre-packing its MOSFET (metal oxide semiconductor field-effect transistor) dosimeter detector unit, LULIN-5 electronics box, BUBBLE detectors & reader, and memory cards for return to the ground.

At the HRF1 (Human Research Facility 1) rack, Whitson deactivated the MedOps cardiac defibrillator and conducted its periodic checkout, which was to be recorded on video and later dumped to the ground (Last time done: 8/29/07). *[This routine maintenance task is scheduled as soon as possible from Expedition start and every 60 days thereafter. For the checkout, the defib is connected to the 120V outlet, equipped with its battery (today #1018) and then allowed to charge, for about five seconds, to a preset energy level (e.g., 100 joules). After the button-triggered discharge, a console indicator signals success or failure of the test. The pacing signal is downlinked via S-band for 1 min. The HRF was powered down afterwards.]*

The CDR-16 worked on the CEVIS (Cycle Ergometer with Vibration Isolation), preparing the exercise machine for the new E16 crewmembers by transferring their specific system files and protocols to the CEVIS PCMCIA memory cards.

As another handover activity, Kotov and Malenchenko spent study time on an overview of the CMS (Crew Medical Systems) exercise equipment aboard the station, a standard requirement for “newcomers” before the first physical exercise session. *[The review covered identification, stowage location and explanatory*

*notes of physical exercise accessories, exercise prescriptions, and detailed instructions for using the TVIS treadmill, RED resistive exerciser, CEVIS cycle ergometer, and HRM heart rate monitor.]*

Malenchenko undertook another standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, his second, using DCS-760 digital still cameras with 400 & 800mm lenses at Service Module (SM) windows 6 & 8 to take imagery of documented CEO Earth targets, today using auto focus and practicing mapping ground features with images having 40-50 percent overlap. Afterwards, Yuri downlinked the obtained images to the ground for analysis, to be discussed at a subsequent tagup. *[The skill training prepares crewmembers for the bottomsides mapping of the Orbiter at the arrival of STS-120/10A next week. During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Atlantis from SM windows 6 & 8, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

Oleg Kotov conducted the routine maintenance of the SOZh (ECLSS/Environment Control & Life Support System) in the SM, including ASU toilet facilities systems/replaceables.

Later, Kotov also worked on the IMS (Inventory Management System), updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The E15 crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR/IMMUNO, FE-1/full time) and RED resistive exerciser (FE-2). E16 crewmembers also performed their first-day workout today, Peggy Whitson on TVIS (1 hr) and Yuri Malenchenko on RED (1 hr).

Later tonight, Peggy will transfer the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

Major science activities in the RS by Yuri Malenchenko today focused on the biotechnological experiment CONJUGATION (Pairing), again replacing cold packs in the Biocont-T container.

SFP (Space Flight Participant) Sheik Shukor had his two daily tagups with his

consultant team at TsUP-Moscow via VHF-1 and performed his fifth day of VC-13 activities, making his scheduled daily entries in the log/questionnaires for the MOP (Motion Perception, study of vestibular adaptation to gravity transition) and MUSCLE/LBP (Low Back Pain) experiments, and worked his parts in the experiments CIS (Cells in Space), and MIS (Microbes in Space), with Malenchenko supporting him with photo documentation.

In addition, Shukor conducted more HDTV photo/video operations of “Life on the Station”, the “Malaysian Science Program on ISS RS”, scenes of the Malaysian “angkasa” (astronaut) using the Russian UFS Operator Restraint System and a “Virtual 3D-Manual for the Angkasa” on the laptop.

The SFP also held another ham radio session (~12:25pm EDT) from the Kenwood station in the SM with school children at the Malaysian National Space Agency’s Planetarium Hall, and spent about 1.5 hours, with CDR Yurchikhin and other crewmembers, in scheduled commemorative (Russian: “symbolic”) activities (a standard tradition for visiting guests and departing expedition crewmembers, doing photo/video recording activities with Malaysian Flags, national shirt, mission and UN patches, Malaysian Code of Principles, signing and stamping envelopes, etc.).

Working from the Russian discretionary “time permitting” task list, Oleg conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

Clay Anderson had about two hours reserved for his own departure preparations for his return on STS-120/10A.

At ~7:55am EDT, The E15/E16 crewmembers joined in an abbreviated news conference with Russian media at TsUP-Moscow, followed by three TV PAO downlinks by Peggy, Yuri and Clay with messages of greetings to the Russian Chapter of the Red Cross, to the guests of the Second Festival of Science in Moscow on 10/19-21 at M.V. Lomonosov MGU, Russia’s first university, and to the Seventh International Scientific & Practical Conference on Manned Space Flights, to be held 11/14 at the Gagarin Cosmonaut Training Center (GCTC).

Afterwards (~9:05am), SFP Sheikh Shukor was scheduled for a “Telebridge” exchange with the Malaysian Prime Minister (Dato’ Seri) Dr. Jamaludin Jarjis (DSJJ) from Kuala Lumpur.

At ~10:55am, Peggy and Clay supported two PAO TV interviews, one with Radio

Iowa (Matt Kelley), the other with KETV-TV in Omaha, Nebraska. *[Peggy hails from Iowa, Clayton from Nebraska.]*

*Soyuz 14S Thruster Firing:* After attitude handover to the Russian MCS (motion control system) this morning at 5:40am EDT, the ISS went into free drift for the standard pre-undock burn test of the Soyuz thrusters at 6:00-6:17am. The hot fire test on the KDU Combined Propulsion System Section 2 and KDU Tank Section 2, was successfully conducted. Attitude authority was returned to USOS momentum management at 6:40am. For the test, the ISS audio was configured for the crew's entry into the Soyuz, the solar arrays were feathered to mitigate structural loads and contamination issues, and certain electrical loads were powered down due to the decreased power availability. All systems have since been successfully returned to nominal configurations.

*Weekend Voluntary Science:* Three optional activities for the voluntary "Saturday Science" program for next weekend (10/20-21) were suggested to Peggy and Clay for their choice. Selection is required by tonight. *[The three choices are: (1) BCAT-3 (Binary Colloidal Alloy Test-3) Magnet Unstick, using the CGBA-4 (Commercial Generic Bioprocessing Apparatus-4), powered up 12 hrs before; (2) CFE VG1 (Capillary Flow Experiment – Vane Gap 1): voice & video of another run of to complete the CFE-VG1 experiment; and (3) SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites), flying two & three satellites, requiring CDRA (CO<sub>2</sub> Removal Assembly) to be running.]*

*Oxygen Repress Update:* O<sub>2</sub> gas remaining in Progress M-61/26P is currently being used for daily cabin air refreshes as required to maintain proper ppO<sub>2</sub> (O<sub>2</sub> partial pressure). At the same time, the Russian Elektron electrolysis system is also supplying O<sub>2</sub>.

Today's CEO (Crew Earth Observation) photo targets were **S. Mozambique** (*this region of Mozambique has received an economic stimulus from oil and gas strikes that have just come on line in the last few years. ISS CEO imagery will be used in a country with almost no maps, to document the associated economic development [planned and unplanned] that surround oil areas. The crew was to shoot an overlapping series of images, looking right at about 45 deg, for about 45 seconds*), and **Jornada Basin, New Mexico** (*the Jornada Basin Long Term Ecological Research [LTER] project focuses on changes in the distribution of soil resources as an index of the impact of vegetation change--desertification--on semiarid lands. Specifically, it is hypothesized that a relatively homogeneous pattern of soil nutrients is found in areas of grassland. Various factors leading to vegetation change alter the distribution of soil resources, leading to the invasion and*

*persistence of shrubs and the development of a patchy distribution of soil nutrients. Nutrient-rich areas that develop under shrub canopies are known as "islands of fertility," while soil resources are lost from the adjacent inter-shrub spaces by wind and water erosion).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 4:40am EDT [= epoch]):

Mean altitude -- 342.6 km

Apogee height -- 344.8 km

Perigee height -- 340.5 km

Period -- 91.39 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0003222

Solar Beta Angle -- -9.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 92 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50989

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:13am/6:36am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis/1E undocking

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**

02/06/08 -- Progress M-62/27P undocking

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- ATV-1 docking (SM aft port)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour/1J/A undocking

04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)

04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)

04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.

04/26/08 -- STS-124/Discovery/1J docking

05/02/08 -- STS-124/Discovery/1J undocking

05/14/08 -- Progress M-64/29P launch

05/16/08 -- Progress M-64/29P docking (DC1)

07/29/08 -- ATV-1 undocking (from SM aft port)

08/11/08 -- Progress M-64/29P undocking (from DC1)

08/12/08 -- Progress M-65/30P launch

08/14/08 -- Progress M-65/30P docking (SM aft port)

09/13/08 -- Progress M-66/31P launch

09/15/08 -- Progress M-66/31P docking (DC1)

09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC

10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.

10/11/08 -- Progress M-65/30P undocking (from SM aft port)

10/14/08 -- Soyuz TMA-13/17S launch

10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)

04/??/09 -- **Six-person crew on ISS**

04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/15/07  
**Date:** Monday, October 15, 2007 12:43:08 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/15/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 4 of joint E15/E16 operations. Day 192 in space for Yurchikhin & Kotov, Day 130 for Anderson. Underway: Week 26 of Increment 15 (last).*

The crew's work/sleep cycle has reverted back to the regular 2:00am-5:30pm EDT.

Aboard ISS, the E15/E16 crew rotation/handover period went underway with full activity schedules for all six residents involved.

CDR-16 Peggy Whitson, FE-2-16 Clay Anderson, FE-1-15 Oleg Kotov and FE-1-16 Yuri Malenchenko joined up for almost 4 hrs of dedicated handover time. In addition, there were "generic" handovers where crewmembers are scheduled together to complete various designated standard tasks.

After yesterday's unstowing and setting up the necessary hardware for the ESA/Russian biomed experiment "IMMUNO", including the KRIOGEM-03M refrigerator, Plasma-03 accessories, CARDIOSCIENCE and SALIVA-IMMUNO kits and wipes, CDR Yurchikhin today undertook the scheduled session (his second), starting with the first stress test (of two) plus saliva and blood sampling, assisted by FE-1 Kotov where required for venous blood collection and blood sample processing (smear and in the Plasma-03 centrifuge). Samples were then secured in the MELFI (Minus Eighty Degree Celsius Laboratory Freezer for ISS) in cold packs in their KB-03 container. *[IMMUNO is a 24-hr. test of human immune system changes, with the objective to investigate immune neuro-endocrine reactions in the space environment by studying samples of saliva, blood and urine using collection kits and the biomedical (MBI) protection kit. Also included is a stress-test questionnaire to be filled out by the subject at begin and end of IMMUNO and based on the accompanying MO-3 stress test, performed during the subject's physical exercise regimen.]*

For today's scheduled Robotics activity, CDR-16 Whitson connected the UOP DCP (utility outlet panel/display & control panel) power bypass cable for powering up the CUP RWS (Cupola Robotics Work Station) and Lab RWS (to be disconnected again later tonight). *[A small issue was encountered during Lab RWS power-up, with an attempted reboot of the laptop not successful. Subsequent RWS checkout proceeded nominally using files from 13A.1.]*

Afterwards, Peggy Whitson and Clay Anderson performed the usual DOUG (Dynamic Onboard Ubiquitous Graphics) software review preparatory to SSRMS (Space Station Remote Manipulator System) activities and then took the RWS systems and the SSRMS through a 10A pre-launch checkout sequence. *[The remotely controlled arm first performed a grapple on the MBS PDGF-3 (Mobile Base System/Power & Data Grapple Fixture 3) on its primary electronic string, then released the Lab PDGF with the other LEE (Latching End Effector) and regrappled the Lab PDGF using the redundant (secondary) string. Finally, the MBS was released and the SSRMS maneuvered to its final position for observing 10A docking. DOUG is a special application running on the MSS (Mobile Service System) RWS laptops that provides a graphical birdseye-view image of the external station configuration and the SSRMS arm, showing its real-time location and configuration on a laptop during its operation.]*

FE-1-16 Malenchenko undertook the standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, his first, using DCS-760 digital still cameras with 400 & 800mm lenses at Service Module (SM) windows 6 & 8 to take imagery of documented CEO Earth targets using manual focusing only. Afterwards, Yuri downlinked the obtained images to the ground for analysis, to be discussed at a subsequent tagup. *[The skill training prepares crewmembers for the bottomsides mapping of the Orbiter at the arrival of STS-120/10A next week. During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Atlantis from SM windows 6 & 8, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

CDR Yurchikhin spent about 30 min of regular equipment servicing in the SM (Service Module)'s toilet facility (ASU), performing the monthly replacement of two urine receptacles (PR & MP) and a filter insert (F-V) with new spares (last time done: 9/17). The old units were trashed.

In addition to the ASU servicing, Fyodor completed today's routine maintenance of the SOZh (ECLSS/Environment Control & Life Support System) system in the SM.

Yurchikhin conducted the (currently daily) job of checkout/verification of IP-1 airflow

sensors in the various RS hatchways, including the SM- and FGB-to-Soyuz tunnels, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

Peggy worked on the BSA (Battery Stowage Assembly) in the U.S. Airlock, terminating the charging of the first set of EMU (Extravehicular Mobility Unit) batteries for the 10A spacewalks and then initiating the recharge on the second set. *[The entire charge cycle is expected to require approximately 40 hours.]*

Whitson and Anderson worked together on a handover familiarization & checkout session with the US CMRS (Crew Medical Restraint System).

As another handover activity, Whitson and Anderson spent study time on an overview of CMS (Crew Medical Systems) exercise equipment aboard the station, a standard requirement for “newcomers” before the first physical exercise session. *[The review covered identification, stowage location and explanatory notes of physical exercise accessories, exercise prescriptions, and detailed instructions for using the TVIS treadmill, RED resistive exerciser, CEVIS cycle ergometer, and HRM heart rate monitor.]*

The E-15 crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR/IMMUNO, FE-1/full time) and RED resistive exerciser (FE-2).

Later tonight, Peggy will transfer the crewmembers’ exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

Yuri Malenchenko worked on the IMS (Inventory Management System), updating/editing its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Major science activities in the Russian segment (RS) by Yuri Malenchenko today focused on the biotechnological experiment CONJUGATION (Pairing), KRIOGEM-3M cooler and MELFI operations (for IMMUNO), and BIOEMULSION. *[CONJUGATION: replace cold packs in Biocont-T container twice. BIOEMULSION: activate mixing mode Day 3; deactivate KT incubator, remove bioreactor and set up in cold Biocont-T near KRIOGEM; take documentary photographs of bioreactor setup.]*

SFP Sheik Shukor tagged up twice with his consultant team at TsUP-Moscow via VHF-1 and conducted his fourth day of VC-13 activities, making his scheduled daily entries in the log/questionnaires for the MOP (Motion Perception, study of vestibular adaptation to gravity transition) and MUSCLE/LBP (Low Back Pain) experiments.

In addition, Shukor completed the head unit R&R (removal & replacement) of the ETD experiment and conducted a 2-hr. ETD session, supported by ground specialist tagup and documentary photography by Yuri.

The SFP (Space Flight Participant) also –

- Performed photo/video operations of “Life on the Station”, the “Malaysian Science Program on ISS RS”, scenes of the Malaysian “angkasa” (astronaut) using the Russian UFS Operator Restraint System and a “Virtual 3D-Manual for the Angkasa” on the laptop;
- Conducted (at ~12:00pm) a ham radio session from the Kenwood station in the SM, i.e., a “general contact” pass with school children of different age groups at the Malaysian National Space Agency’s Planetarium Hall, in Malay and English language (*“In your first flight path over Malaysia, what were your feelings?”; “How do you sleep in zero gravity?”; “What made you want to become an astronaut?”; “This is Malaysia’s 50th independence. What are your feelings?”; “Do you wear shoes in space?”*); and
- Spent about two hours, with CDR Yurchikhin and other crewmembers, in scheduled commemorative (Russian: “symbolic”) activities, a standard tradition for visiting guests and departing expedition crewmembers, today signing and stamping several dozen 15S envelopes for Roskosmos, preparing a flag for A.G. Nikolayev High School in Cheboksary/Chuvash Republic, preparing pennants of the CIS Antiterrorist Center and the Russian National Antiterrorist Committee, etc. and making a photo/video record of everything.

At ~8:00am EDT, all six crewmembers joined in supporting a TV PAO news conference with media gathered at NASA centers (JSC & MSFC), NASA Headquarters and TsUP-Moscow.

At ~11:30am, Peggy Whitson (whose hometown is Beaconsfield, Iowa) and Clay Anderson were interviewed in a PAO TV event by the Associated Press (Marcia Dunn) and station WOI-TV in Des Moines, IA (Stephanie Angleson).

*U.S. Science Update:* Peggy took “POSSUM” payload photos (a standard payload photo activity that obtains electronic still shots of any subrack and locker payload that is moved or reconfigured). Clay replaced the failed ER4 (EXPRESS Rack 4) bulb. Oleg inserted his SAMPLE specimen into MELFI, with SAME equipment to be removed later this week as well as Clay’s final CCISS (Cardiovascular &

Cerebrovascular Control on Return from ISS) session. CSLM-2 (Coarsening in Solid-Liquid Mixtures-2) familiarization was completed ahead of schedule.

*Oxygen Repress Update:* O<sub>2</sub> gas remaining in Progress M-61/26P is currently being used for daily cabin air refreshes as required to maintain proper ppO<sub>2</sub> (O<sub>2</sub> partial pressure). At the same time, the Russian Elektron electrolysis system is also supplying O<sub>2</sub>.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 4:18am EDT [= epoch]):

Mean altitude -- 342.7 km

Apogee height -- 344.9 km

Perigee height -- 340.6 km

Period -- 91.39 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0003176

Solar Beta Angle -- -4.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 84 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50973

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:13am/6:36am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 10/14/07  
**Date:** Sunday, October 14, 2007 2:59:15 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/14/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- Day 3 of joint E15/E16 operations. Day 191 in space for Yurchikhin & Kotov, Day 129 for Anderson. Ahead: Week 26 of Increment 15 (last).*

The crew's work/sleep cycle, today at **4:30am–5:30pm EDT**, will be adjusted one more time tomorrow, reverting to the regular 2:00am-5:30pm.

Aboard ISS, the E15/E16 crew rotation/handover period went underway with full activity schedules for all six residents involved.

CDR-16 Peggy Whitson and FE-2-16 Clay Anderson joined up for about 1:20 h of dedicated handover time. In addition, there are "generic" handovers where crewmembers are scheduled together to complete various designated standard tasks.

The new E-16 crew (Peggy, Yuri, Clay) performed the mandatory two-hour OBT (onboard training) emergency egress drill for the case of rapid cabin depressurization, with Russian and US specialists standing by at both control centers for crew questions or comments. The rule is that the emergency egress exercise should be performed by every new station crew once within seven days after departure of the previous crew. *[Background: Purpose of the drill is to (a) familiarize the station residents with the location of hardware and the positions of valves used in emergency situations, (b) work through the Russian Segment (RS) hardware deactivation procedures, (c) practice crew emergency joint activities, and (d) identify crew comments and suggestions that arise during training regarding crew procedures and equipment. In the RS, the crew translated along the emergency egress path to the FGB nadir port (where Soyuz TMA-11 is currently docked), checking hardware such as the Sokol suits, cable cutters, fire extinguisher*

*(OKR), gas masks (IPK), emergency procedures books, valve settings, hatch rubber seal & restraint integrity, etc. In the US Segment (USOS) the inspection focused on fireports being unblocked in the Lab {21}, with other US modules to be checked by future crews), readiness of CSA-CP (Compound Specific Analyzer-Combustion Products), ISS leak kit, PBA (portable breathing assembly) and PFE (portable fire extinguisher), emergency procedures books, valve settings, integrity of hatch rubber seals, presence of hatch handrails, etc. The exercise was topped off by a thorough debrief with the ground via S-band. During the session, the crew simulated executing the planned emergency procedures while moving about the station. For the case of an onboard fire and for emergency descent, there are other mandatory emergency drill OBTs.]*

Malenchenko worked in the Soyuz TMA-11/15S Descent Module, dismantling the two "Klest" (KL-152) TV cameras and their light units for return to the ground on 14S, temporarily stowing them in the SM (Service Module).

In preparation for their return to gravity next Sunday, Fyodor Yurchikhin and Oleg Kotov undertook their fourth preliminary session of the Russian MO-5 MedOps protocol of cardiovascular evaluation in the below-the-waist reduced-pressure device (ODNT, US: LBNP) on the VELO ergometer, assisting each other in turn as CMO (Crew Medical Officer). *[The one-hour assessment, supported by ground specialist tagup (VHF) and telemetry monitoring from Russian ground sites (at 9:52am & 1:01pm EDT), uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph cuff wired to the cycle ergometer's instrumentation panels. The Chibis ODNT provides gravity-simulating stress to the body's cardiovascular/circulatory system for evaluation of Yurchikhin's and Kotov's orthostatic tolerance (e.g., the Gauer-Henry reflex) after several weeks in zero-G. The preparatory training generally consists of first imbibing 150-200 milliliters of water or juice, followed by a sequence of progressive regimes of reduced ("negative") pressure, set at -20, -25, -30, and -35 mmHg (Torr) for five minutes each while shifting from foot to foot at 10-12 steps per minute, while wearing a sphygmomanometer to measure blood pressure. The body's circulatory system interprets the pressure differential between upper and lower body as a gravity-like force pulling the blood (and other liquids) down. Chibis data and biomed cardiovascular readings are recorded. The Chibis suit (not to be confused with the Russian "Penguin" suit for spring-loaded body compression, or the "Kentavr" anti-g suit worn during reentry) is similar to the U.S. LBNP facility (not a suit) used for the first time on Skylab in 1973/74, although it appears to accomplish its purpose more quickly.]*

For his second session of the ESA/Russian biomed experiment "IMMUNO", scheduled tomorrow, Fyodor Yurchikhin set up the IMMUNO urine collection

hardware and took air samples with the IPD-NH<sub>3</sub> Draeger tubes sampler, testing for ammonia (NH<sub>3</sub>) in the SM. *[IMMUNO is a 24-hr. test of human immune system changes, with the objective to investigate immune neuro-endocrine reactions in the space environment by studying samples of saliva, blood and urine using collection kits and the biomedical (MBI) protection kit. Also included are entries in a fluid/medications intact log, and a stress-test questionnaire to be filled out by the subject at begin and end. Urine is collected during a 24-hour period, conventionally divided into two twelve-hour phases: morning-evening and evening-morning.]*

Peggy Whitson worked on the MEC (Medical Equipment Computer), configuring its HRM (Heart Rate Monitor) software for the new Expedition 16 crew, herself, Yuri Malenchenko and Dan Tani. *[E16-specific settings include birthday and height of each crewmember.]*

Oleg Kotov conducted the routine maintenance of the SOZh (ECLSS/Environment Control & Life Support System) system in the SM, including ASU toilet facilities systems/replaceables plus the weekly collection of toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Kotov also gathered weekly data on total operating time and activity durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's Air Revitalization Subsystem (SOGS) for reporting to TsUP.

Later, Oleg worked on the IMS (Inventory Management System), updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

FE-1-16 Malenchenko performed the (currently daily) job of checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM- and FGB-to-Soyuz tunnels, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

FE-2-16 Anderson filled out the regular FFQ (Food Frequency Questionnaire), his 14<sup>th</sup>, on the MEC. *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Major science activities in the Russian segment (RS) by Yuri Malenchenko today

focused on the biotechnological experiment CONJUGATION (Pairing), KUBIK refrigerator, KRIOGEM-3M cooler, and MELFI operations, BIOEMULSION, SAMPLE, BLOKIN 4, and P-KINASE. *[CONJUGATION: removal of the Recomb-K hybridization experiment from the KRIOGEM-03M cooler and setting up in Biocont-T container, later replacing cold packs in Biocont- . KRIOGEM-3M set to -22 degC & installed cold packs. BIOEMULSION: activation of mixing mode - Day 2 and photo documentation during mixing. SAMPLE: collect specimen from FE-1 Kotov and set up in MELFI. KUBIK-3: deactivate incubator in Soyuz, transfer & hook up in SM. BLOKIN 4: set KUBIK-3 to +6 degC. P-KINASE: set up 8 new containers in KUBIK-3 at +6 degC.]*

SFP Shukor was scheduled to tag up twice with his consultant team at TsUP-Moscow via VHF and to conduct his third day of VC-13 activities, making his scheduled daily entries in the log/questionnaires for the MOP (Motion Perception, study of vestibular adaptation to gravity transition) and MUSCLE/LBP (Low Back Pain) experiments.

In addition, Shukor conducted his daily science program, today the MIS (Microbes in Space) experiment, TOP (Torques in Micro-G) study, and FIS (Malaysian Food in Space) demonstration, assisted and photo/video-recorded in action by Yuri Malenchenko and Fyodor Yurchikhin as required.

The SFP (Space Flight Participant) also –

- had a live-downlink HDTV (High Definition Television) session from the RS at ~8:05am, assisted by CDR Yurchikhin,
- followed later (~1:15pm) by a ham radio session from the Kenwood station in the SM, a “general contact” pass with Malaysian school children of different age groups at the Malaysian National Space Agency’s Planetarium Hall, in Malay and English language.

Working from the Russian discretionary “time permitting” job list, Oleg conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

The E-15 crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR/+MO-15, FE-1/+MO-15) and RED resistive exerciser (FE-2).

Later Clay transfers the crewmembers’ exercise data file to the MEC for downlink,

as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 3:55am EDT [= epoch]):

Mean altitude -- 342.8 km

Apogee height -- 344.9 km

Perigee height -- 340.7 km

Period -- 91.39 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0003164

Solar Beta Angle -- 0.7 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 90 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50957

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:13am/6:36am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis/1E undocking

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**

02/06/08 -- Progress M-62/27P undocking

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- ATV-1 docking (SM aft port)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour/1J/A undocking

04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)

04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)

04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.

04/26/08 -- STS-124/Discovery/1J docking

05/02/08 -- STS-124/Discovery/1J undocking

05/14/08 -- Progress M-64/29P launch

05/16/08 -- Progress M-64/29P docking (DC1)

07/29/08 -- ATV-1 undocking (from SM aft port)

08/11/08 -- Progress M-64/29P undocking (from DC1)

08/12/08 -- Progress M-65/30P launch

08/14/08 -- Progress M-65/30P docking (SM aft port)

09/13/08 -- Progress M-66/31P launch

09/15/08 -- Progress M-66/31P docking (DC1)

09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC

10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.

10/11/08 -- Progress M-65/30P undocking (from SM aft port)

10/14/08 -- Soyuz TMA-13/17S launch

10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)

04/??/09 -- **Six-person crew on ISS**

04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/13/07  
**Date:** Saturday, October 13, 2007 2:48:51 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/13/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- Day 2 of joint E15/E16 operations. Day 190 in space for Yurchikhin and Kotov, Day 128 for Anderson.*

The crew's work/sleep cycle, today at **9:30am–8:00pm EDT**, will be adjusted once more tomorrow (4:30am–5:30pm).

Aboard ISS, the E15/E16 crew rotation/handover period went underway with full activity schedules for all six residents involved.

CDR Yurchikhin and FE-1 Kotov each were scheduled for another run with the Russian MBI-21 PNEVMOKARD experiment, their fifth on-orbit session (which forbids moving or talking during data recording). The experiment is controlled from the RSE-Med A31p laptop, equipped with new software, and uses the TENZOPLUS sphygmomanometer to measure arterial blood pressure. The FE-1 took documentary photography of his crewmate as subject for downlinking via BSR-TM or OCA. *[PNEVMOKARD (Pneumocard) is an attempt to obtain new scientific information to refine the understanding about the mechanisms used by the cardiorespiratory system and the whole body organism to spaceflight conditions. By recording (on PCMCIA cards) the crewmember's electrocardiogram, impedance cardiogram, low-frequency phonocardiogram (seismocardiogram), pneumotachogram (using nose temperature sensors), and finger photoplethysmogram, the experiment supports integrated studies of (1) the cardiovascular system and its adaptation mechanisms in various phases of a long-duration mission, (2) the synchronization of heart activity and breathing factors, as well as the cardiorespiratory system control processes based on the variability rate of physiological parameters, and (3) the interconnection between the cardiorespiratory system during a long-duration mission and the tolerance of orthostatic & physical activities at the beginning of readaptation for predicting possible reactions of the crewmembers organism during the their return to ground.]*

In the Soyuz TMA-11/15S Habitation Module, FE-1-16 Yuri Malenchenko installed the LKT local temperature sensor commutator (TA251M1B) of the BITS2-12 onboard telemetry system and its ROM/read-only memory unit (PZU TA765B), both kept in storage from an earlier Soyuz.

CDR-16 Peggy Whitson and FE-2-15 Clay Anderson have about three hours of dedicated handover time. In addition, there are “generic” handovers where crewmembers are scheduled together to complete various designated standard tasks.

The ISS RODFs (Russian Operations Data Files) are being updated by Yurchikhin and Malenchenko with new books, sheets and CD-ROMs delivered on 15S, including a special “VC13” book. *[TMA-10/14S is now set up for Yurchikhin, Kotov and Shukor, while TMA-11/15S has become the contingency CRV (crew return vehicle) for Whitson, Malenchenko and Anderson.]*

Later today, Oleg Kotov will conduct the periodic (currently daily) checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatchways, including the FGB-to-Soyuz tunnel, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners off (SKV-1).]*

In the SM, Yurchikhin will assist VC-13 Muszaphar Shukor in installing his own removable HDD (hard disk drive) on the RSE-1 laptop for his SFP (Spaceflight Participant) activities.

CDR-16 Peggy Whitson started in on her SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) experiment by donning her Actiwatch. *[The black-banded Actiwatch was initialized by Clay Anderson on 10/9. Data collection began yesterday (10/12)m and a download session will be added to Peggy’s “job jar” task list within the month. If she takes off the watch, she is to document the duration. SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR’s sleep/wake patterns and light exposure, her special Actiwatch device measures the light levels encountered by her as well as her patterns of sleep and activity throughout the Expedition.]*

To support subsequent ground activation of the ER-1 (EXPRESS Rack 1), FE-2 Anderson connected the rack’s cooling jumper to the Lab ITCS (Internal Thermal Control System) at the LAO2 RIP (Rack Interface Panel).

Later, Anderson activated the SAMS ICU (Space Acceleration Measurement

System/Interim Control Unit) in the LAB1PS rack (Drawer 2), in support of ground activities with the structural dynamics monitoring system.

CDR Yurchikhin was to do the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), FE-1-15 Kotov will update/edit its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

CDR-16 Whitson performed the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries are to be replaced if necessary. *[Purpose of the 10-min. activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements. Two CSA-CP (CSA-Combustion Products) instruments recorded CO, HCN and HCl readings at the SM Central Post (#1060, prime) and in the Node (#1057, backup), while the CSA-O<sub>2</sub> units (#1063, #1042) looked for O<sub>2</sub> in the Lab and the CDMK (#1013) for CO<sub>2</sub> in SM and Lab. Also recorded were battery ticks. No battery changes required. The instruments were turned off afterwards, except for the prime CSA-CP #1060 unit, and returned to their regular locations. The CSA-CPs also have O<sub>2</sub> sensors but they are out of calibration and their readings are currently omitted.]*

Later, the FE-2-15, monitored by Whitson, will conduct the periodic (monthly) CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout on the prime unit (#1060) and backup unit (#1057). *[The CSA-CP is a passive cabin atmosphere monitor that provides quick response capability during a combustion event (fire). Its collected data are stored on a logger. Clay changed out the prime unit's battery, then zero-calibrated both instruments (to eliminate drift in the combustion sensors). Following zero calibration, the backup unit was stowed, while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

In the U.S. Airlock, Clay is scheduled to troubleshoot the battery charging equipment, to determine whether BC-2 ch.3 (Battery Charger 2/channel 3) is functional. Afterwards, the FE-2 will begin the recharging of EMU (Extravehicular Mobility Unit) batteries in the BSA (Battery Stowage Assembly) for the 10A spacewalks later this month.

Major science activities in the Russian segment (RS) by FE-1-16 Malenchenko today are focusing on the biotechnological experiment CONJUGATION (Pairing), KUBIK refrigerator and MELFI operations, BIOEMULSION, SAMPLE, P-KINASE and AT-Space. *[CONJUGATION: removal of the Recomb-K hybridization experiment from the KRIOGEM-03M cooler, process activation at ambient temperature, photography of Recomb-K hardware, completing activation and returning to KRIOGEM at +4 degC. BIOEMULSION: activation of mixing mode - Day 1. SAMPLE: collect specimen from FE-1-16 and set up in MELFI, P-KINASE: second fixation of another 4 containers, set up containers in BLOK. AT-Space: wetting and set up of 8 containers in centrifuge KUBIK-1 at +22 deg.]*

SFP Shukor is scheduled to tag up twice with his consultant team at TsUP-Moscow via VHF and to conduct his second day of work, making the his scheduled daily entries in the log/questionnaires for the MOP (Motion Perception, to study vestibular adaptation to gravity transition) and the MUSCLE/LBP (Low Back Pain) MUSCLE experiments.

Shukor is also working his part of the CIS (Cells in Space) and MIS (Microbes in Space) experiments, assisted and photo/video-recorded in action by Oleg Kotov.

At ~2:42pm EDT, Peggy and Yuri joined in downlinking generic PAO TV messages from the Expedition 16 crew for use at NASA Visitors Centers around the U.S. and video for use as promo "tease" on NASA TV and the *nasa.gov* website.

The E-15 crew worked out on an abbreviated (1-hr.) physical exercise program on the CEVIS cycle ergometer (FE-2-15) and TVIS treadmill (CDR-15, FE-1-15).

Later tonight, Clay will transfer the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

### **Weekly Science Update** (*Expedition Fifteen – 25<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* ALTEINO instrument continues to acquire nominally radiation levels in the SM. A close-out session for this increment is planned on 10/16. Subsequent downlink is currently planned on 10/17. During the close-out session, the ALTEINO device will be relocated to the PIRS module, and radiation measurements will continue to be performed.

*ANITA:* "Clay, thank you for completing the ANITA non-local sampling protocol as

a Saturday Science activity. The ground team appreciates the wonderful video you provided. ANITA is now under EFO control and will continue to operate in the local sampling mode.”

*AT-Space*: Nominal preparatory activities occurred in Baikonur. Activation of the experiment is currently planned for today (10/13). The experiment will be performed in the RS.

*BCAT (Binary Colloidal Alloy Test)*: Reserve.

*BIOKIN*: Nominal preparatory activities occurred in Baikonur. Activation of the experiment was planned before 15S docking, on 10/12. The experiment will be performed in Soyuz 15S after docking.

*CARDIOCOG-2*: Completed.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS)*: Continuing,

*CFE (Capillary Flow Experiment)*: Reserve.

*CHROMOSOME-2 (E14 SFP)*: Completed.

*CSI-2/CGBA (CGBA Science Insert #2/Commercial Generic Bioprocessing Apparatus)*: In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2)*: Complete.

*EarthKAM (Earth Knowledge Acquired by Middle School Students)*: Next scheduled operation is 10/29-11/3.

*EMCH (Elastic Memory Composite Hinge)*: Complete.

*EPO (Educational Payload Operation) Kit C*: Planned.

*ETD (Eye Tracking Device)*: First session for Yuri Malenchenko is currently scheduled on 10/18 (GMT291). For the Angkasa (Malaysian astronaut), repair activity of ETD is currently planned on 10/14-15. Subsequent ETD sessions with him as a test subject are planned on 10/15 and 10/17.

*IMMUNO (Saliva Sampling)*: Second session currently planned for 10/14-16.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*:

Complete.

*MISSE (Materials ISS Experiment)*: Ongoing.

*MTR-2 (Russian radiation measurements)*: Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1*: Plants continue to grow in B1 and A2 Experiment Containers (EC's). During the last week, plants in B1 EC showed a slower growth and some aging phenomena unexpected at this stage, which scientists attribute to physiological stress conditions in space. An unexpected additional set of leaves have appeared, leading to a delay of the stems' apparition in the observation zone. "We have observed a vigorous growth for the plant in the A2 Container. Our science assessment is that all the plants are now approximately in the same morphological development stage, despite the initial delayed germination of plant in A2. Regular video monitoring of the plants continue, awaiting now the stem apparition in both Containers." Upon stem apparition, 2D- then 3D-recordings of stem circumnutation will begin for several days. An extension of the total duration of the experiment (from 75 days to 90 days) has to be anticipated at this stage, in order to retrieve the next generation seeds at the end of the plant growth cycle.

*MUSCLE (VC-13 SFP)*: In-flight questionnaires are currently scheduled daily from 10/10 to 10/19.

*MSG-SAME (Microgravity Science Glovebox)*: SAME completed experiment operations last week and the remaining steps are sample removal and de-integration from the MSG. The tests involved 5 carousels each with 6 samples selected from 5 different sample materials. Overall the tests were very successful. Good measurements of the smoke properties were made by all of our diagnostics and the results indicate consistent particle size measurements for each material. "We have seen substantial variation in the smoke particle size and the smoke aging tests were very successful. In general, the Teflon and Kapton particles were quite small (approximately 100 nm) and the silicone and lampwick particles were somewhat larger. These results will be further corroborated by the transmission electron microscope images we will obtain of the smoke particles captured by the Thermal Precipitator assemblies when they are returned to Earth. Thanks to all for getting our tests conducted so expeditiously."

*NEOCYTOLYSIS (E14 SFP)*: Completed.

*NOA-2 (Nitric Oxide Analyzer)*: Planned.

*NUTRITION*: This week's Nutrition blood draw and urine collection marks the

completion of the experiment objectives for Increment 15. The Nutrition PI and team wish to extend their thanks for your dedication in completing the experiment objectives.

*P-KINASE*: Nominal preparatory activities occurred in Baikonur. Activation of the experiment was planned before 15S docking (completion TBC), on 10/12 (GMT285). The experiment will be performed in the ISS-RS.

*PMDIS (Perceptual Motor Deficits in Space)*: Complete.

*SAMPLE*: First crew sampling session for Malenchenko was planned for today (10/13). ISS sampling currently planned on 10/14. *SAMPLE* cultures will be collected on 10/19.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems)*: n/a

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight)*: “Clay, you have completed all of your Increment 15 Sleep tasks successfully. Thanks for initializing the I-16 CDR Actiwatch and agreeing to wear your Actiwatch down on the Shuttle. The PI really appreciates your continued support. Your last activity will be to doff the Actiwatch with the shuttle crewmembers before re-entry.”

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite)*: Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft)*: In progress.

*TRAC (Test of Reaction & Adaptation Capabilities)*: Planned.

*CEO (Crew Earth Observations)*: Through 10/10 the ground has received a total of 17,950 CEO images for review and cataloging for Increment 15. 1,257 frames were received in the last week. “We have identified and prioritized for review those frames with camera times corresponding to the request times of the following CEO targets: Antarctic Ice Pack; Kerguelen, South Indian Ocean; Iceberg A22A, South Atlantic Ocean; Patagonian Glaciers, South America; Rotor Kamm Impact Crater, Namibia; Perth, Australia; Jebel at Tair Eruption, Red Sea; South Mozambique; and Xianggang (Hong Kong), China. We’ll provide feedback as we work our way through these. We have already noted your incredibly detailed view of Rotor Kamm and a nice mapping of Perth. Your striking image on 9/25 of the whole of East Falkland Island with smoke plumes will be published on NASA/GSFC’s Earth Observatory website this weekend. Your view is the first time, in our collective memory, for photographic documentation of active fires in this part of the world. Thanks for noting this event and acquiring it for our collection!”

Today's optional CEO (Crew Earth Observation) photo targets were **Lake Poopo, Bolivia** (*weather was predicted to be clear for a near-nadir pass over Lake Poopo. High resolution images of the Lake shoreline were requested for tracking water level changes. The Lake was located slightly to the right of track*), and **Florida Coastal Everglades** (*this Long Term Ecological Research [LTER] site tracks changes to the Everglades wetland ecosystem. Such changes include reduction of water supply to the marshes and conversion of grassland to other land uses. The ISS overpass took the station directly south of the Miami metropolitan area. The crew was to look to the left of track as they approached Miami; overlapping frames of the Everglades to the SW of the urban area will be most useful*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 5:07am EDT [= epoch]):

Mean altitude -- 342.9 km

Apogee height -- 345.1 km

Perigee height -- 340.7 km

Period -- 91.39 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0003256

Solar Beta Angle -- 5.6 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.75

Mean altitude loss in the last 24 hours -- 90 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50942

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:13am/6:36am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 10/12/07

**Date:** Friday, October 12, 2007 2:45:19 PM

**Attachments:**

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### **ISS On-Orbit Status 10/12/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 189 in space for Yurchikhin & Kotov, Day 127 for Anderson.*

The crew's work/sleep cycle, today at **7:00am – 12:30pm EDT**, will be adjusted twice more: tomorrow (9:30am–8:00pm), and on 10/14 (4:30am–5:30pm).

**Yest kasaniya! Soyuz TMA-11/15S docked smoothly** at the FGB nadir port at 10:50am EDT, two minutes ahead of time, with Expedition 16 crewmembers Dr. Peggy Whitson (CDR) and Yuri Ivanovich Malenchenko (FE-1, Soyuz-CDR) plus Malaysian SFP (Space Flight Participant) Sheik Muszaphar Shukor. After about 1.5 hrs spent in Soyuz on pre-transfer activities, the crew opened hatches at 12:22pm, followed by crew transfer, the traditional joyful welcome event, and installation of the BZV QD (quick disconnect) clamps by Malenchenko and Yurchikhin. *[After successful "kasaniya" (contact), automatic "sborka" (closing of Soyuz & Service Module {SM} port hooks & latches) took place shortly thereafter. Attitude control authority had been handed over to the Russian MCS (Motion Control System) at ~7:20am and was returned to US CMG control at ~12:00noon. For the 15S docking, the Russian SM thrusters were disabled during Soyuz volume pressurization & clamp installation and returned to active attitude control after sborka. Before hatch opening, the crew performed leak checks of the Soyuz modules and the Soyuz/ISS interface vestibule. They then doffed their Sokol suits and set them up for drying, deactivated the Atmosphere Purification Unit (BOA) in the Descent Module (SA), replaced the Soyuz ECLSS LiOH cartridges, equalized Soyuz/ISS pressures, and put the spacecraft into conservation mode on ISS integrated power.]*

Before the docking, FE-2 Anderson prepared for the arrival by connecting the regular ITCS LTL (Internal Thermal Control System/Low Temperature Loop) coolant jumper connection to the LAB1D6 rack, to support the ground-commanded

activation of the U.S. CDRA (Carbon Dioxide Removal Assembly), and Houston lowered the temperature setpoint to the regular 9.4 degC. *[CDRA activation took place at 12:30pm-1:30pm.]*

FE-1 Kotov prepared for time-critical payloads arriving on Soyuz by activating the ESA temperature-controlled incubator chambers KUBIK AMBER and KUBIK-2 in the FGB and setting the KRIOGEM-03M refrigerator for the BIOEMULSION payload in the SM to +4 degC. Later tonight, Oleg also activates KUBIK-1 in the FGB, at +22 degC.

Anderson turned on the A31p laptop in the FGB for the video/comm transmission from the Russian segment (RS), while Kotov configured station comm (STTS) for the docking, and CDR Yurchikhin set up and handled the video coverage of the visitor arrival and subsequent downlinking of the footage via US Ku-band. Upon docking, on TsUP Go, Kotov also switched hatch KVDs (pressure equalization valves) between FGB and Soyuz to electric control mode.

After the arrival and crew greetings (~12:25pm EDT), Kotov reestablished nominal STTS comm configuration in hardline mode (MBS), while FE-1-16 Yuri Malenchenko immediately began with payload transfers from Soyuz to ISS and set-ups, while CDR-16 Peggy Whitson went through the procedures of setting up and drying out the Sokol spacesuits and gloves worn by the three Soyuz travelers.

High-priority payload transfers to the SM for the E-15/E-16 crew rotation period involve

- BIOEMULSIYA bioreactor (to be set up in the KRIOGEM-03M cooler, with photography);
- KONYUGATSIYA in its Biokont-T container (also in KRIOGEM);
- REGENERATSIYA hardware, with photography;
- P-KINASE (8 containers inserted in KUBIK-3 at +37 degC);
- BIOTREK (with bio cultures);
- LAKTOLEN & ARIL;
- MICROBES IN SPACE (with VC13 SFP);
- PCS (Protein Crystallization in Space, with VC13 SFP); and
- CELLS IN SPACE (with VC13 SFP).
  - *[BIOEMULSIYA (Bioemulsion, BTKh-14) investigates the design and improvement of a closed-type autonomous (thermostat-controlled) bioreactor for obtaining biomass of organisms and bioactive substances (BAV) without additional ingredients input or removal of metabolism products, for bacterial, enzymatic, and pharmaceutical preparations;*
  - *KONYUGATSIYA (Conjugation, BTKh-10) deals with the processes of genetic material transmission using bacterial conjugation, in the*

- *Biokont-T container and Rekomb-K hardware in the KRIOGEM-03M;*
- *REGENERATSIYA (Regeneration, BIO-12) researches the impacts of micro-G on structural and functional recovery of damaged organs and tissues in Planaria (water flatworms) in the Cryogem-3M cooler/glove box;*
- *P-KINASE determines whether differentiation of monocytes into macrophages is disrupted due to the slowdown in signal exchange of an isoform of protein kinase C (PKC) in human monocytes in micro-G;*
- *BIOTREK (BTkh-8) studies the influence of heavy charged particles of space radiation on the generic properties of cells producing biologic active substances;*
- *LAKTOLEN (BTkh-5), ARIL (BTkh-5): Effects of space flight on cultures of Lactolen- and Interleukin ARIL producing cells;*
- *MICROBES in Space (MIS): to characterize the effect of micro-G and cosmic radiation on the gene growth kinetics of H. pylori (or P. aeruginosa) and Acinetobacter baumannii microbes;*
- *PCS studies the effects of micro-G on lipases crystallization and the differences in the spatial structures of protein crystals obtained on Earth and in micro-G; and*
- *CELLS in Space (CIS), with three areas of emphasis: Eukaryotic cells in space (ECIS), endothelial dysfunction and inflammation in micro-G (HUVEC), and function and transcriptional changes in osteoblasts (bone tissue cells) in micro-G (OSTEO).]*

All new arrivals received the obligatory standard Safety Briefing to familiarize them with procedures and escape routes in case of an emergency. *[The Briefing included pointing out the location of the “Emergency Response/Visiting Crew” books, showed how to move about the station without getting hurt or accidentally disturbing air flow meters/sensors (PP IP-1) and familiarized the Malaysian SFP with his switch to a different Soyuz for return.]*

CDR Yurchikhin also took Shukor on a one-hour guided tour of the ISS, acquainting him with both segments, his CIS & MIS work station in the DC1 Docking Compartment, other work locations, the sites for his scheduled VHF-1 and ham radio conferences, RSE-1 laptop, uplink printouts and camera equipment for his use, email ops, and private family conference using the IP (Internet Protocol) phone.

Later tonight, SFP Shukor is scheduled to tag up with his consultant team at TsUP-Moscow via VHF, set up his MIS & CIS hardware/containers in the KUBIK-AMBER temperature-controlled cooler, activate the PCS experiment and begin his first work on a laptop for email ops and on the IP phone for private conference.

Afterwards, as Greg Olsen, Anousheh Ansari and Charles Simonyi before him, the SFP will make the first of his scheduled daily entries in the log/questionnaires for the MOP (Motion Perception, to study vestibular adaptation to gravity transition) and the MUSCLE/LBP (Low Back Pain) MUSCLE experiments.

Oleg Kotov and Yuri Malenchenko will swap out Shukor's and Anderson's IELK (Individual Equipment & Liner Kit, Russian: USIL) between the two Soyuz vehicles, TMA-10/14S & TMA-11/15S, including their tailored Sokol spacesuits. The IELKs of Whitson and Malenchenko are already in the 15S spacecraft that has now become the Expedition 16 CRV (crew return vehicle), good for a maximum of 200 days in space. *[A crewmember is not considered transferred until her/his IELK, AMP (Ambulatory Medical Pack) and ALSP (Advanced Life Support Pack) drug kit are transferred. After today's installation of the VC13 IELK, SFP Shukor is now considered a 14S crewmember, and **Expedition 16 has technically begun its residence** aboard ISS. TMA-10 has been docked at ISS since 4/9/07. By the time of its return on 10/21, the spacecraft will have spent 198 days in space, 2 days short of its "warranty" life.]*

FE-2 Anderson will relocate the three Emergency SODF (Station Operations Data Files) books from 15S into the 14S vehicle and later update the ISS EMER-1 SODF with new pages delivered on 15S.

Using an uplinked detailed E15/E16 crew handover procedures handbook, Peggy Whitson and Clay Anderson began the standard handover activities, to be continued through the docked period ahead. *[Since both Whitson and Malenchenko are experienced ISS "veterans", having already spent long duty watches on the station, their handover sessions will be considerably shorter than is the case for "rookies", i.e., newcomers to the station.]*

Malenchenko meanwhile will work on the transferred BIOEMULSIYA payload, placing the Bioreactor in the incubator (KT) and activating it to "culturing mode". His activities are to be photographed by Kotov for documentation.

FE-2 Clay Anderson is scheduled for the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

On the IMS (Inventory Management System), Clay will update/edit its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

With the increase in crew size from three to six placing more emphasis on ventilation, Fyodor Yurchikhin is to check later on the function of the important IP-1

airflow sensors in the various Russian segment hatchways, including the SM-to-DC1 (26P) tunnel, and the FGB-to-Node and FGB-to-Soyuz passageways.

Working from the Russian discretionary “time permitting” task list, Oleg is to do the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

The ISS-15 crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR/full time, FE-1/full time, FE-2) and RED resistive exerciser (FE-2).

Later tonight, Clay will transfer the crewmembers’ exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

*ATU Update:* Anderson’s R&R (removal & replacement) of ATU-6 (Audio Terminal Unit 6) in the US Airlock yesterday was successful, as evidenced by voice checks following the ATU activation. *[During the R&R, it was noted that the unit is seated on the cold plate with only one fastener out of seven. It has been determined it was launched in this configuration. Analysis is underway to determine how many additional fasteners need to be installed to ensure adequate heat transfer.]*

Today’s CEO (Crew Earth Observation) photo targets were **Nile River Delta** (*the crew has done an excellent job of photographing the eastern edge of the Nile delta as well as Lake Manzala. For this pass researchers requested that they concentrate on the western edge of the delta near Alexandria which should have been under ISS orbit track*), and **Mississippi Delta Region** (*the Mississippi River Delta is an area of the land built up by alluvium deposited by the Mississippi River as it slows down and enters the Gulf of Mexico. Requested were contextual views of the delta. The Mississippi delta was left or west of orbital track*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 6:18am EDT [= epoch]):

Mean altitude -- 343.0 km

Apogee height -- 345.2 km

Perigee height -- 340.8 km

Period -- 91.40 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0003297

Solar Beta Angle -- 10.4 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.75

Mean altitude loss in the last 24 hours -- 65 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50927

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:13am/6:36am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis/1E undocking

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**

02/06/08 -- Progress M-62/27P undocking

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- ATV-1 docking (SM aft port)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour/1J/A undocking

04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)

04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
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08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
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04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/11/07  
**Date:** Thursday, October 11, 2007 2:52:57 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/11/07**

All ISS systems continue to function nominally, except those noted previously or below.

The crew's work/sleep cycle, currently at **5:00am–8:30pm EDT**, will be adjusted a few more times: tomorrow (7:00am-12:30am), on 10/13 (9:30am–8:00pm EDT), and on 10/14 (4:30am–5:30pm).

**Soyuz TMA-11/15S**, with Expedition 16 crewmembers Dr. Peggy Whitson (CDR) and Yuri Malenchenko (FE-1, Soyuz-CDR) plus Malaysian Sheik Muszaphar Shukor Al Masrie, 13<sup>th</sup> Visiting Crewmember (VC) to spend time on the station, continues to catch up with the ISS for the **docking tomorrow morning at ~10:52am EDT**. As per TsUP/Moscow report this morning, all systems aboard the ship are nominal, and the crew is in great shape. *[FD1 activities yesterday included the first two maneuver burns, DV1 (12:57pm) & DV2 (1:42pm). FD2 activities, started this morning with Soyuz crew wakeup at ~2:30am on Orbit 12, include systems & crew health status reports to TsUP, preparation of the Soyuz Habitation Module (SA) workspace, building attitude for and executing the DV3 burn at ~10:28am, placing Soyuz back in its sun-spinning "barbecue" mode (ISK), and swapping CO<sub>2</sub> absorption cartridges (LiOH) in the BO. On FD3, the crewmembers will put on their Sokol suits and PKO biomed harnesses, transfer to the SA, activate its air purification system (SOA) and close the hatch to the Descent Module (BO). After the DV4 burn, activation of the active Kurs-A system on Soyuz and of the passive Kurs-P on the Service Module (SM), with a short Kurs-A/P test and up to three additional adjustment burns during automated rendezvous, station fly-around to align with the SM aft port will begin at ~400m range, followed by station keeping at ~160m and docking at the FGB nadir port. Whitson & Malenchenko will replace Expedition 15 CDR Yurchikhin & FE-1 Kotov. FE-2 Clay Anderson remains on the station, joining Expedition 16 until later this month when he is replaced by U.S. Astronaut Daniel Tani on STS-120/10A. Dr. Shukor, the 35-year old orthopedic*

*physician at the University Kebangsaan Malaysia Hospital in Kuala Lumpur, is Malaysia's first "Angkasawan" (Astronaut), flying under the auspices of "Agensi Angkasa Negara", the Malaysian National Space Agency, will return with Fyodor & Oleg on 10/21 in Soyuz TMA-10/14S (undocking 3:13am; landing 6:36am EDT, 4:36pm local).]*

In preparation of the guest cosmonaut's onboard program, CDR Yurchikhin exercised the new HDTV (High Definition Television) system, set up and tested last Monday (10/8) in the RS (Russian Segment), conducting a downlink test of the camera system with Malaysia, relayed through Russian ground sites and VHF, plus S-band/audio, and supported by tagup with TsUP video distribution systems (BRTK-TVS) specialists.

FE-1 Kotov completed the periodic (about twice a month) replenishing of the Elektron oxygen generator's water supply for electrolysis, filling the KOV thermal loops' EDV container with water collected in CWCs (Contingency Water Containers) #1068, #1065, and #1064 from the Lab CCAA (Common Cabin Air Assembly) dehumidifier. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

The FE-2 meanwhile completed the weekly 10-min. CWC inventory/audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

FE-2 Anderson had about 4 hrs of his work day assigned to a major IFM (inflight maintenance) in the U.S. Airlock (A/L), uninstalling a failed ATU (Audio Terminal Unit, #6) on the A/L Avionics Rack (F1) and replacing it with a new spare. *[For the time-consuming R&R, the F1 rack needed to be rotated away from the cabin wall, requiring Clay to install two pivot fitting to allow the rotation. For clearance, EMU (Extravehicular Mobility Unit)/spacesuits and the EDDA (EMU Don Doff Assembly) in the A/L had to be moved temporarily out of the way, and the ATU connections needed to be safed by the ground beforehand. The EACP (EVA/EMU Audio Control Panel) Y-branched cable on the A/L ATUs was swapped with a new "low clearance" EACP Y-cable from the SPCE (Service, Performance & Checkout Equipment) maintenance kit. The failed ATU-6 will be returned on 10A. There are 3 ATUs in the A/L, one of which must be functional for EVAs, so long as the suited EVA crew has established UHF (Ultra High Frequency) radio communication.]*

Clay also retrieved and stowed the two FMKs (Formaldehyde Monitoring Kits) deployed by him on 10/9 in the Lab (below CEVIS cycle) and SM (most forward handrail).

Kotov collected the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

In addition, Oleg completed the daily routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), with the regular insert replacements in its toilet system (ASU).

As part of Soyuz docking preparations, Anderson verified powerdown of onboard ham radio equipment (Kenwood in SM & Ericsson in FGB) to prevent RF interference during the proximity operations and also closed the protective shutters of the Lab science window.

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR/full time, FE-1/full time, FE-2) and RED resistive exerciser (FE-2).

Later tonight, Clay will transfer the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary "time permitting" job list, FE-1 Kotov conducted the regular downlinking of system data/log files of the Russian payload server (BSPN), prepared yesterday, from the RSS1 laptop and FlashCard to the ground via OCA for analysis.

At ~5:30pm EDT tonight, FE-2 Anderson is scheduled to conduct a private "handover" teleconference with his replacement, FE-2-16 Daniel Tani, to be launched on STS0-120/10A.

At ~6:30pm, Clay will also have his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

Today's CEO (Crew Earth Observation) photo targets were **Lonar Impact Crater** (*Lonar impact crater is unique in that it is the only well-preserved simple crater [simple crater being defined as having a crater diameter of <4 km] on Earth in*

continental flood basalts. This is important as analogue for lunar impact craters. Currently CEO researchers have about nine images of this crater taken from ISS, none of them taken with the 400 mm lens with the doubler. The crater should have been slightly left [west] of the ascending pass. Lonar is 1.83 km in diameter but should have been visible because of its shape and the lake within the crater. It is a very young crater, dated at about 50,000 years), **Roter Kamm Impact Crater** (Roter Kamm impact crater is about 2.5 km in diameter and about 130 m deep. The crater was formed by the impact of an asteroid about 300 m in diameter. The interior of the crater is covered in thick sand deposits. This is a relatively young impact crater, dated at about 3.7 million years. The crater should have been slightly left of the orbital track), **Mt. Kilimanjaro, Kenya** (Mount Kilimanjaro is a renowned volcanic peak of eastern equatorial Africa. It is situated in northeastern Tanzania near the border with Kenya. At 19,341 feet the highest peak in Africa, it sustains a small icecap with glaciers which are under study as indicators of climate variations. Kilimanjaro should have been directly under track), **Lake Poopo, Bolivia** (lowering and rising of water levels in Lake Poopo give indications of short-term regional climate fluctuations. Lake Poopo is a large saline lake located in a shallow depression in the Altiplano Mountains in Bolivia. The water level in this lake is highly variable because it lacks any major outlet and it has a mean depth of no more than 3 m. Therefore, even small regional climate variations can have an impact on the appearance of the lake), and **Florida Coastal Everglades** (research focuses on understanding ecosystem processes along the two major drainage basins in Everglades National Park. The team is particularly interested in the area where freshwater and estuarine wetlands meet. This landscape change in response to changing freshwater inflow [with Everglades restoration], sea level rise [climate change responses], and disturbance [particularly hurricanes and fire] is of particular interest to science. Previous CEO imagery of this area has nicely documented the Florida Keys and the western side of Florida Bay [the area between the Keys and the mainland]. The crew was requested to focus on the northern side of Florida Bay [southern edge of the park]).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 5:55am EDT [= epoch]):

Mean altitude -- 343.1 km

Apogee height -- 345.2 km

Perigee height -- 340.9 km

Period -- 91.40 min.  
 Inclination (to Equator) -- 51.63 deg  
 Eccentricity -- 0.0003207  
 Solar Beta Angle -- 15.1 deg (magnitude decreasing)  
 Orbits per 24-hr. day -- 15.75  
 Mean altitude loss in the last 24 hours -- 55 m  
 Revolutions since FGB/Zarya launch (Nov. 98) -- 50911

**>>> Timeline for 15S Launch through Docking** (all times EDT):

- 15S Launch 10/10 **09:22am**
- Orbital Insertion 09:31:22 am
- DV1 burn (18.52 m/s) 12:57pm
- DV2 burn (8.19 m/s) 01:42pm
- Crew sleep 04:00pm
- Crew awake 10/11 02:30am
- DV3 (2.00 m/s) 10:28am
- USOS to RS MCS Handover 10/12 07:20am
- ISS mnvr to dock attitude 08:10am
- Soyuz Kurs-A Activation (T1) 09:18:54am
- SM Kurs-P Activation (T1) 09:20:54am
- Good Kurs-P data at 80 km 09:43:23am
- Kurs-A & Kurs-P Short Test at 15 km 10:04:23am
- Range = 9km - VHF-2 activation 10:10:43am
- Range = 8km - Soyuz TV activation 10:12:03am
- AR&D Flyaround mode start 10:29:44am
- AR&D Stationkeeping start 10:38:44am
- RGS AOS 10:39:44am
- AR&D Final Approach start 10:43:26am
- Local Sunset 10:48:11am
- 15S Docking at FGB nadir port 10/12 **10:52am**
- Soyuz hooks closed 11:12:26am
- Local Sunrise 11:24am
- RS to USOS MCS Handover 12:00 noon

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~10:52am)  
 10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:13am/6:36am)  
 10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
 10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
 11/03/07 -- STS-120/Discovery/10A undocking  
 11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/10/07  
**Date:** Wednesday, October 10, 2007 1:55:09 PM  
**Attachments:** [image002.gif](#)

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### **ISS On-Orbit Status 10/10/07**

All ISS systems continue to function nominally, except those noted previously or below.

**Soyuz TMA-11 (15S) launched on time (9:22 am EDT)** at Baikonur Cosmodrome in Kazakhstan (*see picture at bottom*), carrying Expedition 16 crewmembers Dr. Peggy Whitson (CDR) and Yuri Ivanovich Malenchenko (FE-1) plus Malaysian Sheik Muszaphar Shukor Al Masrie, the 13<sup>th</sup> Visiting Crewmember (VC) to visit the space station, flying under a Russia/Malaysia government-to-government offset agreement. At launch time, the ISS was halfway between the coast of Argentina and the Falkland Islands, i.e., the launch was not visible to the ISS crew. 15S achieved orbital insertion at 9:31am after a nominal ascent, and all antennas and solar arrays were deployed ok. *[Whitson and Malenchenko will replace Expedition 15 CDR Fyodor Yurchikhin and FE-1 Oleg Kotov who will return with Muszaphar Shukor on 10/21 in Soyuz TMA-10/14S (undocking 3:13am; landing 6:36am EDT, 4:36pm local). FE-2 Clay Anderson remains aboard, joining Expedition 16 until later this month when he will be replaced by US Astronaut Daniel Tani on STS-120/10A. It is the second ISS visit for both Whitson and Malenchenko, Peggy having been a crewmember of Expedition 5, arriving with STS-111 in 2002, while Yuri was on station with Ed Lu on Increment 7, arriving on Soyuz TMA-2 in 2003. In 2000, 46-year old Malenchenko had flown to ISS with STS-106/Atlantis (ISS-2A/2B), and in 1994 he flew on the Russian space station Mir (EC-16), as Soyuz TM-19 crewmember. Dr. Shukor, a 35-year old orthopedic physician at the University Kebangsaan Malaysia Hospital in Kuala Lumpur, is Malaysia's first "Angkasawan" (Astronaut), flying under the auspices of the Malaysian National Space Agency "Agensi Angkasa Negara".]*

Before breakfast, FE-2 Anderson completed the last day of his fourth session with the NASA/JSC experiment NUTRITION. During today's part, he collected another urine sample for storage in the MELFI (Minus-Eighty Laboratory Freezer for ISS). The sampling kit was then stowed away. *[The current NUTRITION project*

*expands the previous Clinical Nutritional Assessment profile (MR016L) testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R +30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

CDR Yurchikhin serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The regen process will be terminated at ~3:30pm EDT. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods. Filter bed 1 was regenerated yesterday.]*

Yurchikhin also completed his first session of the 24-hour of ECG (electrocardiogram) recording under the Russian MedOps MO-2 protocol. *[For the ECG recording, the two Russian crewmembers took turns in donning the five-electrode Holter harness that read their dynamic (in motion) heart function from two leads over 24 hours and recorded data on the Kardioregistrator 90205 unit.]*

Oleg Kotov used the Russian AK-1M adsorber and Draeger tubes, on a cartridge belt with a pump, to conduct the periodic sampling of cabin air for subsequent analysis on the ground. *[Kotov started out by taking air samples in the SM and FGB and checking for leaked-out Freon in the SM, then switched to the IPD-CO Draeger tubes sampler to check for CO (carbon monoxide) in the SM.]*

Later, Clay Anderson also collected air samples with a U.S. GSC (Grab Sample Container) at the center of the Lab and SM.

In preparation for their return to gravity, Yurchikhin and Kotov undertook their third training session of the Russian MO-5 MedOps protocol of cardiovascular evaluation in the below-the-waist reduced-pressure device (ODNT, US: LBNP) on the Russian VELO ergometer, assisting each other in turn as CMO (Crew Medical Officer). *[The one-hour assessment, supported by ground specialist tagup (VHF) and telemetry monitoring from Russian ground sites (at 6:53am EDT & 8:25am), uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph cuff wired to the cycle ergometer's instrumentation panels. The Chibis ODNT provides gravity-simulating stress to the body's cardiovascular/circulatory system for evaluation of Yurchikhin's and Kotov's orthostatic tolerance (e.g., the Gauer-Henry reflex) after several weeks in zero-G. The preparatory training generally consists of first imbibing 150-200 milliliters of water or juice, followed by a sequence of progressive regimes of reduced ("negative") pressure, set at -20, -25, -30, and -35 mmHg (Torr) for five minutes each while shifting from foot to foot at 10-12 steps per minute, while wearing a*

*sphygmomanometer to measure blood pressure. The body's circulatory system interprets the pressure differential between upper and lower body as a gravity-like force pulling the blood (and other liquids) down. Chibis data and biomed cardiovascular readings are recorded. The Chibis suit (not to be confused with the Russian "Penguin" suit for spring-loaded body compression, or the "Kentavr" anti-g suit worn during reentry) is similar to the U.S. LBNP facility (not a suit) used for the first time on Skylab in 1973/74, although it appears to accomplish its purpose more quickly.]*

In the Service Module (SM), the FE-1 performed the second part of the periodic water sampling for return to Earth begun yesterday, using empty drinking bags (or food container) to collect condensate (KAV) samples upstream of the Water Purification Column Unit (SRV-K2M BKO), the water supply system (SVO-ZV) and the Water Distribution & Heating Unit (BRP-M-warm), then replacing the sampler for flushing the gear each time. *[Later, he removed the sampler, disassembled the setup and dumped the flush water into a towel. Curiously, there is no really cold water on tap on ISS.]*

After Anderson prepared the auditory test equipment, each crewmember took the periodic O-OHA (on-orbit hearing assessment) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC laptop application. It was Fyodor's and Oleg's third, Clay's second session. *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month. Note: There have been temporary hearing deficits documented on some U.S. and Russian crewmembers, all of which recovered to pre-mission levels.]*

Fyodor and Clay set up and tested the television connections in the SM for covering the Soyuz 15S docking with US Ku-band assets, after putting in place the necessary cable hook-up of the UOP DCP (utility outlet panel/display & control panel) power bypass cable at the CUP RWS (Cupola Robotic Work Station). *[With the video available on an SSC (Station Support Computer) A31p laptop in the SM, the feed can be routed by single cable through the FGB and then via OpsLAN to the US segment (USOS) and downlinked from the Lab to MCC-Houston via Ku-band for subsequent transmittal to TsUP-Moscow. The TV set-up concluded with a downlink test of the configuration via Ku-band, after which the A31p was*

*deactivated, with all cabling left intact until after the docking.]*

In preparation for their return to Earth, Yurchikhin and Kotov transferred their collected photo images from digital cards to laptop (RSK1 for CDR, RSE1 for FE-1) and then to removable HDDs (Hard Disk Drives). New images taken for the remainder of their stay will also be saved on one of the HDDs, and all disks will be prepacked on 10/18 for return on Soyuz.

The FE-2 conducted the periodic status checkup & filter inspection of the running CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to Earth.]*

Oleg completed the routine maintenance of the SOZh (ECLSS/Environment Control & Life Support System) system in the SM, including ASU toilet facilities systems/replaceables.

Working from his discretionary job list, Kotov also conducted the daily updating/editing of the standard daily IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The CDR and FE-1 had another ~2 hrs reserved between them for more equipment prepacking for return or disposal in the Soyuz TMA-10/14S spacecraft. *[Excessed cargo and trash go into the Orbital Module (BO) for burning up in the atmosphere. Return cargo comes into the Descent Module (SA), for its landing in Kazakhstan on 10/21 (Sunday), at ~4:36pm local time in sunlight.]*

The two Russian crewmembers continued their standard End-of-Increment reduced workdays, which gives each of them an hour per day for personal preparations for their return.

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR/MO-5, FE-1/MO-5).

Later Clay will transfer the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

At ~2:25pm, Clay powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), to conduct, at 2:30pm, a ham radio exchange with students at Isummasaqvik School, Quaqttag, Quebec/Canada. *[The town of Quaqttag, population 333, is at the Northern tip of the Province of Quebec, near Ungava Bay. There are 125 students in Isummasaqvik School, with English and Inuktitut as languages. The community's territory covers 225 sq. mi., with numerous archeological sites, traditional activities and handicrafts. To the east of the village, Île Akpatok has been long recognized as a polar bear and walrus hunting ground. "How do you eat and drink your food in space?"; "How and where do you sleep?"; "Can you see Arctic Canada and the Northern Lights from Space?"; "What is the most unusual event that you have seen?"; "Would you like to travel to Mars? Do you think that there are extra-terrestrials there?"; "Have you ever seen or used the Canadarm?"; "How many liters of fuel does it take to go from Earth to the Space Station?"; "What is the first thing that you see in the morning when you wake up?"; "Is there a toilet? How do you use it?"]*

Discretionary tasks on the coming week's U.S. "job jar" for Clay Anderson or the other crewmembers in their free time include unpacking 26P-delivered U.S. items, replacing an ER4 (EXPRESS Rack 4) light bulb, checking out SAFER (Simplified Aid for EVA Rescue) pyro valves, covering SSC (Station Support Computer) Firewire ports, and prepacking 10A return cargo.

Working from the Russian discretionary "time permitting" job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

*VC13 Equipment Setup:* For preparing the work place for VC13 Dr. Shukor, Yurchikhin and Kotov requested that they be allowed to set up the KUBIK-1, -2 & -3 refrigerator/thermostats and PGB (Portable Glovebox) in the FGB instead of the SM, as planned earlier, using FGB power outlets. Rationale: to reduce noise for the CDR and FE-1 in the SM habitation area prior to their departure on Soyuz.

*Sleep Cycle Shift:* Tonight, bedtime will be delayed by 2.5 hours (from 5:30pm to 8:00pm EDT) as the crew's sleep cycle starts shifting to the right in preparation for 15S arrival on 10/12 and 14S departure on 10/21:

- Crew sleep/wake tonight: 8:00pm/5:00am,
- crew sleep/wake tomorrow: 8:30pm/7:00am,
- crew sleep/wake Fri-Sat: 12:30am/9:30am.

*Progress 26P Rodnik Update:* Leak checks performed by the crew on 10/8-9 on the membrane (expulsion bladder) of the Progress' Rodnik BV1 tank indicated membrane damage. The leak check, as usual, was performed in two parts, - by using a pump to compress the bladder and later to pressurize it. Both parts confirmed a small membrane leak. The Progress Rodnik tankage therefore is unsuitable for urine transfer, and the crew was advised to use EDV containers for trashing the liquid waste on Progress.

Today's CEO (Crew Earth Observation) photo targets were **Xianggang (Hong Kong), China** (*the city of Hong Kong lies on the eastern side of the Pearl River Delta. In the 1990's Hong Kong's population increased sharply, reaching 6.99 million in 2006. Such rapid growth will no doubt cause dynamic changes in the city as it tries to accommodate this population growth. As one of the "mega cities" on the target list, requested was detailed mapping of the city and its boundaries. With the 400 mm lens the crew were not able to capture the entire city in one frame, however, they were able to document the infrastructure of the city at a finer detail*), and **S. Mozambique** (*this region of Mozambique has received an economic stimulus from oil and gas strikes that have just come on line in the last few years. ISS imagery will be used in a country with almost no maps, to document the associated economic development [planned and unplanned] that surround oil areas. This time of year imagery of this region is somewhat problematic and researchers could not promise a cloud free view, however this area is important enough for them to ask for it even if the weather may be marginal. The crew was to shoot an overlapping series of images of the area.*)

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:06am EDT [= epoch]):

Mean altitude -- 343.1 km

Apogee height -- 345.2 km

Perigee height -- 341.0 km

Period -- 91.40 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0003147

Solar Beta Angle -- 19.7 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.75

Mean altitude loss in the last 24 hours -- 52 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50896

**>>> Timeline for 15S Launch through Docking** (all times EDT):

15S Launch	10/10	<b>09:22am</b>
Orbital Insertion		09:31:22 am
DV1 burn (18.52 m/s)		12:57pm
DV2 burn (8.19 m/s)		01:42pm
Crew sleep		04:00pm
Crew awake	10/11	02:30am
DV3 (2.00 m/s)		09:28am
USOS to RS MCS Handover	10/12	07:20am
ISS mnvr to dock attitude		08:10am
Soyuz Kurs-A Activation (T1)		09:18:54am
SM Kurs-P Activation (T1)		09:20:54am
Good Kurs-P data at 80 km		09:43:23am
Kurs-A & Kurs-P Short Test at 15 km		10:04:23am
Range = 9km - VHF-2 activation		10:10:43am
Range = 8km - Soyuz TV activation		10:12:03am
AR&D Flyaround mode start		10:29:44am
AR&D Stationkeeping start		10:38:44am
RGS AOS		10:39:44am
AR&D Final Approach start		10:43:26am
Local Sunset		10:48:11am
15S Docking at FGB nadir port	10/12	<b>10:52am</b>
Soyuz hooks closed		11:12:26am
Local Sunrise		11:24am
RS to USOS MCS Handover		12:00 noon

**Significant Events Ahead** (all dates Eastern, some changes possible):

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~10:52am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:13am/6:36am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

***Godspeed, Peggy, Yuri and Muszaphar!***



*Yuri in foreground, Peggy in back.*

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/09/07  
**Date:** Tuesday, October 09, 2007 4:28:01 PM  
**Attachments:** [image001.gif](#)  
[image002.gif](#)  
[image003.gif](#)

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### **ISS On-Orbit Status 10/09/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, FE-2 Anderson began his fourth session with the NASA/JSC experiment NUTRITION, for which he had to forego exercising and food intake for eight hours. The assessment is scheduled for today and tomorrow. *[After collecting an initial urine sample, Clay followed it with phlebotomy, i.e., drawing blood samples (from an arm vein) which he first allowed to coagulate, then spun in the HRF RC (Human Research Facility/Refrigerated Centrifuge) and finally placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. The equipment was then stowed. NUTRITION activities today included the required 24-hour data urine collection by Anderson, by securing samples during the day, all stored immediately in MELFI. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing in-flight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection*

*(made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

Anderson also started his final session with the SLEEP (Sleep-Wake Actigraphy and Light Exposure during Spaceflight) experiment, first downloading his data from his Actiwatch into the software application on the HRF-1, then re-initializing and donning his the Actiwatch, after changing the lithium battery and activating Peggy Whitson's Actiwatch for Increment 16 as well as changing the 9V battery in the Reader. *[Purpose of the experiment is to document the effects of long duration spaceflight on sleep-wake activity patterns using the wrist-worn the Actiwatch. The latter is a small light-weight activity & light recording device for the entire duration of their mission. The sleep-wake activity and light exposure patterns obtained in-flight will be compared with baseline data collected for two weeks between Launch (L)-120 and L-75 and from L-11 through L-0. Recovery from spaceflight will also be assessed from Return (R)+0 through R+7. These data should help in understanding the effects of spaceflight on sleep as well as aid in the development of effective countermeasures for both short and long-duration spaceflight.]*

CDR Yurchikhin serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #1 of the regenerable dual-channel filtration system. The regen process will be terminated at ~4:45pm EDT. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

In the Service Module (SM), the CDR performed the periodic water sampling for return to Earth on Soyuz, using empty drinking bags (or food container) to collect condensate (KAV) samples upstream of the Water Purification Column Unit (SRV-K2M BKO). More samples, from the water supply system (SVO-ZV) and the Water Distribution & Heating Unit (BRP-M-warm) will be taken tomorrow. *[Curiously, there is no really cold water on tap on ISS.]*

FE-1 Kotov conducted the regular downloading of system data/log files from the Russian payload server (BSPN) to the RSS1 laptop and onto a FlashCard, to be dumped to the ground via OCA for analysis. *[The data transfer, required for periodic analysis of server condition, was preceded by a comm check between the RSS1 and the BSPN.]*

After more leak checking on the Progress M-61 (26P) Rodnik BV1 water tank bladder today, it was determined that the BV1 bladder is not leak tight and therefore not suitable for urine storage. *[The pressurization of the collapsed bladder of the Rodnik water storage tank was conducted as a leak check, lasting ~4h 30min, preparatory to the liquid waste transfer to the tank for disposal. Each of the two*

*spherical Rodnik tanks, BV1 & BV2, consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane.]*

Fyodor completed the periodic computer network “pantry” audit, listing battery status & IDs, operational issues, floppy drive serial numbers and stowage locations for all Russian laptops (RSS1, RSS2, RSK1, RSE1, RSE-Med, TP2 and Laptop 3). On RSS1, Fyodor also changed/updated four icons for BSPN (Payload Server) and BSMM (Payload Matching Unit/computer) operation. *[This task had been on the voluntary Russian job list up to now.]*

FE-2 Anderson worked on the three onboard copies of the SODF (Station Operations Data File) Warning Book from the FGB, SM, and LAB, updating the section on ISS cabin hi-pressure warning with pen-&-ink changes and then restowing the books.

After last week’s successful operation of the U.S. OGS (Oxygen Generation System) and shutdown on Friday (10/5), Clay Anderson today accessed the OGS rack, demated the O<sub>2</sub> (oxygen) outlet QD (quick disconnect), performed an O<sub>2</sub> purge on the H<sub>2</sub> (hydrogen) sensor and reinstalled the WDS (Water Distribution System) on the rack front.

After tagging up with a medical specialist on the ground to discuss details of their Earth return on 10/21, Yurchikhin and Kotov had two hours set aside to conduct the standard Soyuz descent training exercise for each crew returning on a Soyuz. The exercise, which strictly forbids any command activation (except for switching the InPU display), was also supported by a tagup and discussions with a ground instructor at TsUP/Moscow via S-band. *[The training session included a review of the pertinent ODF (operational data files), specifically the books on Soyuz Insertion & Descent Procedures, Emergency Descents, and Off-Nominal Situation Procedures, and it featured special emphasis on nominal operations with the Neptune-MEh cockpit console. During descent, Yurchikhin, as Soyuz CDR, will occupy the middle couch, with Sheikh Muszaphar Shukor Al Masrie in the left seat and Kotov in the Descent Module’s right Kazbek couch. Pending the final State Commission decision at about 3.5h before undocking, 14S return is expected for 10/21 (Sunday).]*

Anderson performed the periodic deployment of two passive FMK (formaldehyde monitoring kit) sampling assemblies in the Lab (below CEVIS) and SM (most forward handrail) for two days, to catch any atmospheric formaldehyde on a collector substrate for subsequent analysis on the ground.

Oleg performed the periodic data collection and downlink on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse. He then closed down the BIO-5 experiment, stowing the MIS Accessories kit and BKGA (Gas Analyzer Calibration Assembly) with racks.

FE-1 Kotov completed his first session of the 24-hour of ECG (electrocardiogram) recording under the Russian MedOps MO-2 protocol. After CDR Yurchikhin assisted him in doffing the harness, it was Fyodor's turn for the 24-hour run of the MO-2 protocol, with Oleg lending a hand in his donning the five-electrode Holter harness. *[The electrodes read his dynamic (in motion) heart function from two leads over 24 hours and record data on the Kardioregistrator 90205 unit.]*

Yurchikhin completed the routine maintenance of the SOZh (ECLSS/Environment Control & Life Support System) system in the Service Module (SM), including ASU toilet facilities systems/replaceables.

Working from his discretionary job list, the CDR also conducted the daily updating/editing of the standard daily IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The two Russian crewmembers again had about one hour each for their personal preparations for their Soyuz 14S departure.

The FE-2 conducted the periodic (every two weeks) inspection of the RED (Resistive Exercise Device) canister cords and accessory straps as well as the canister bolts for re-tightening if required.

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR/full time, FE-1/full time, FE-2), and RED resistive exerciser (FE-2).

Later Clay transferred the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

Discretionary tasks on the coming week's U.S. "job jar" for Clay Anderson or the other crewmembers in their free time include unpacking 26P-delivered U.S. items, replacing an ER4 (EXPRESS Rack 4) light bulb, checking out SAFER (Simplified

Aid for EVA Rescue) pyro valves, covering SSC (Station Support Computer) Firewire ports, and prepacking 10A return cargo.

*Soyuz TMA-11/15S Status Update:* At Baikonur, a meeting of the State Commission was held, with GCTC (Gagarin Cosmonaut Training Center) Director V. V. Tsibliev reporting about the crew readiness for the planned mission. Also reporting on the readiness of the Soyuz-FG launch vehicle and TMA-11 spacecraft was RSC-Energia President and General Designer V.A. Lopota. The State Commission approved the prime & backup crews for the 15S mission and the ISS-16 increment and also adopted a decision to continue preparation of the Soyuz-FG fueling and launch at the set time tomorrow morning, at 9:22am EDT (17:22 o'clock Moscow time). **(See below for photographs of today).**

*Consumables Update:* Consumables status was reported today by the IMMT (ISS Mission Management Team) to be good. All consumables are projected to be "Green" through Increment 16. Most restrictive consumables are food, toilet inserts and KTO waste containers, which all reach skip cycle around the same time in January of 2008. Food and potable water will be resupply by Progress 28P.

*Reboost Update:* US and RS ballistics specialists determined there is no need for reboost during 10A. Normally, a small delta-V boost is experienced during mated ops, but none is required this time.

Today's CEO (Crew Earth Observation) photo targets were **Xianggang (Hong Kong), China** *(the city of Hong Kong lies on the eastern side of the Pearl River Delta. In the 1990's Hong Kong's population increased sharply, reaching 6.99 million in 2006. Such rapid growth will no doubt cause dynamic changes in the city as it tries to accommodate this population growth. As one of the "mega cities" on the target list, requested was detailed mapping of the city and its boundaries. With the 400 mm lens the crew were not able to capture the entire city in one frame, however, they were able to document the infrastructure of the city at a finer detail),* and **S. Mozambique** *(this region of Mozambique has received an economic stimulus from oil and gas strikes that have just come on line in the last few years. ISS imagery will be used in a country with almost no maps, to document the associated economic development [planned and unplanned] that surround oil areas. This time of year imagery of this region is somewhat problematic and researchers could not promise a cloud free view, however this area is important enough for them to ask for it even if the weather may be marginal. The crew was to shoot an overlapping series of images of the area.)*

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 6:44am EDT [= epoch]):

Mean altitude -- 343.2 km

Apogee height -- 345.3 km

Perigee height -- 341.1 km

Period -- 91.40 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0003122

Solar Beta Angle -- 24.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.75

Mean altitude loss in the last 24 hours -- 55 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50880

**>>> Timeline for 15S Launch through Docking** (as of 10/7, all times EDT):

15S Launch 10/10 **09:22:37am**

Orbital Insertion 09:31:22 am

DV1 (18.52 m/s) 12:58pm

DV2 (8.19 m/s) 01:42pm

DV3 (2.00 m/s) 10/11 09:28am

USOS to RS MCS Handover 10/12 07:20am

ISS mnvr to dock attitude 08:10am

Soyuz Kurs-A Activation (T1) 09:18:54am

SM Kurs-P Activation (T1) 09:20:54am

Good Kurs-P data at 80 km 09:43:23am

Kurs-A & Kurs-P Short Test at 15 km 10:04:23am

Range = 9km - VHF-2 activation 10:10:43am

Range = 8km - Soyuz TV activation 10:12:03am

AR&D Flyaround mode start 10:29:44am

AR&D Stationkeeping start 10:38:44am

RGS AOS 10:39:44am

AR&D Final Approach start 10:43:26am

Local Sunset 10:48:11am

15S Docking at FGB nadir port 10/12 **10:52am**

Soyuz hooks closed 11:12:26am

Local Sunrise 11:24am

RS to USOS MCS Handover 12:00 noon

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

10/10/07 -- Soyuz TMA-11/15S launch (9:22:37am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~10:52:30am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:13am/6:36am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC

10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

***Baikonur Launch Readiness Review by State Commission –  
10/9/07***





***God Speed, Peggy and Crewmates!***

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 10/08/07  
**Date:** Monday, October 08, 2007 2:44:51 PM  
**Attachments:** [image001.gif](#)  
[image002.gif](#)  
[image003.gif](#)

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### **ISS On-Orbit Status 10/08/07**

All ISS systems continue to function nominally, except those noted previously or below.  
*Columbus Day holiday: "slow ops" for ISS. Underway: Week 25 of Increment 15.*

FE-1 Kotov started his first session of the Russian MedOps MO-2 protocol which calls for 24-hour recording of his ECG (electrocardiogram). *[For the ECG recording, Oleg donned the five-electrode Holter harness that read his dynamic (in motion) heart function from two leads over 24 hours and record data on the Kardioregistrator 90205 unit. CDR Yurchikhin assisted his crewmate in the harness donning (and tomorrow's doffing).]*

FE-2 Anderson spent most of his day in the U.S. Airlock on get-ahead tasks for 10A, resizing EMUs (Extravehicular Mobility Units) and preparing PWRs (Payload Water Reservoirs) for Expedition 16 CDR Peggy Whitson and FE-1 Yuri Malenchenko, plus performing periodic maintenance. *[After resizing the spacesuits for Peggy and Yuri, Clay consolidated water from PWR #1025 into #1024 and worked on degassing a total of three PWRs by manually removing gas bubbles in #1024 (contents 18 lbs), #1026 (21 lbs), #1027 (23 lbs). Yearly maintenance water dump and refill was due for the primary and reserve water tanks of EMU 3018. Afterwards, the FE-2 also replaced the UIA (Umbilical Interface Assembly) supply water biocide filter, which was approaching its end-of-life (520 lbs H<sub>2</sub>O processed), with a new unit (#1007). The waste water filter remains unchanged.]*

In preparation for upcoming urine transfer to the Progress M-61 (26P) Rodnik BV1 water tank, Kotov conducted the regular six compressor test activations to inflate and pressurize the cargo ship's BV1 tank bladder. *[The pressurization of the collapsed bladder of the Rodnik water storage tank is conducted as a leak check, lasting ~4h 30min, preparatory to the liquid waste transfer to the tank for disposal. Each of the two spherical Rodnik tanks consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane.]*

The FE-1 completed the routine maintenance of the SOZh (ECLSS/Environment Control &

Life Support System) system in the Service Module (SM), including ASU toilet facilities systems/replaceables.

The daily updating/editing of the standard daily IMS (Inventory Management System) “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur), was conducted today by the CDR as a voluntary task from his “time permitting” job list.

Anderson conducted the microbial (bacterial & fungal) “T+5 Day” analysis of air samples collected on 10/3 with the MAS (Microbial Air Sampler) kit in Lab, Node and SM. *[The sampling analysis is performed once per month for the first three months, and once every three months thereafter. Bacterial and fungal air samples are taken at two locations in each module. The colony growth on the sampling slides is analyzed after five days of incubation in four Petri dishes. For onboard visual analysis of media slides from SSK (Surface Sampling Kit), MCDs (microbial capture devices) from WMK (Water Monitoring Kit), coliform detection bags from MWAK (Microbial Water Analysis Kit), and Petri dishes from MAS, the crew has a procedure for visual inspection of samples for bacterial and fungal colony growths after appropriate incubation periods. Petri Dishes and SSK slides were stowed for return on 10A.]*

FE-1 Kotov worked with the Russian BRTK-TVS video distribution system, running downlink tests with the Japanese HDTV camera (instead of the standard LIV camera) over RGS (Russian Groundsite) on Daily Orbit 13, with ground specialist tagup via S-band. *[These tests are relevant to ATV (Automated Transfer Vehicle) arrival control.]*

In preparation for the arrival of VC13 (Visiting Crewmember #13) Sheikh Muszaphar Shukor Al Masrie, Yurchikhin and Kotov set up the SM work area for the SFP(Space Flight Participant)’s planned experiments during his 9-day stay on the station. *[Prepping the work area with the pre-delivered equipment is vital for the success of VC13 by reducing the SFP’s time spent on his program. For the VC13 experiments, the crew set up the ESA temperature-controlled incubator chamber KUBIK AMBER, KUBIK 1 and KUBIK 2, the PGB (Portable Glove Box) and the KRIOGEM-03 cooler for the BIOEMULSION equipment in the SM, the ETD (Eye Tracking Device) in the DC1 Docking Compartment, and also looked for a new stowage site for the ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) hardware. The Malaysian VC-13 onboard program itself will be performed from 10/10/07 to 10/21/07. The duration of VC-13 joint flight as part of the ISS RS (Russian Segment) is 9 days (from 10/12 through 10/21). The VC-13 program entails –*

- *Science experiments (CIS/Cells in Space, MIS/Microbes in Space, PCS/Protein Crystallization in Space, FIS/Malaysian Food in Space, TOP/Study of Torques in Microgravity, plus three previous ESA experiments - ETD, MOP & MUSCLE);*
- *Three real-time RS-TsUP/Moscow live TV links;*
- *Five ham radio sessions;*
- *Interior photo & video imagery aboard the ISS RS;*
- *Commemorative activities; and*
- *Talks with the Malaysian cosmonaut consultative team (via Russian communications systems) twice daily, in the morning and evening.]*

Working off his discretionary job list, the CDR also conducted the fourth photo/video session preparatory to the arrival of VC-13. The task involved taking pictures of Malaysian sites (such as Kelang, Kuala Lumpur, Ipoh, George Town, Taiping, Alor Seta, and Kota Baru) using the Nikon D2X digital camera from SM window #9. *[The images are stored from flash card, without compression ("raw"), on the RSK1 laptop, later to be copied to RSE1, for return to Earth.]*

The CDR performed troubleshooting on the Onboard Complex Control System (SUBK), checking voltage continuity and fuses of a Common Power Switching timer (BSK DB2).

Afterwards, Fyodor supported the ground in reactivating the Elektron O<sub>2</sub> (oxygen) generator, which had to be turned off to allow the temporary disabling of the BITS2-12 Onboard Telemetry Measurement System for the SUBK work. *[Reactivation was at 32 amps. As usual Fyodor monitored the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

FE-2 Anderson unstowed and set up the hardware for his fourth NUTRITION experiment session, scheduled tomorrow for urine collection and Wednesday. *[The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing in-flight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will help to better understand the impact of countermeasures (exercise & pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current new NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI/Minus Eighty Degree Celsius Laboratory Freezer for ISS), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR/full time, FE-1/full time, FE-2), and RED resistive exerciser (FE-2).

Later Clay transferred the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary “time permitting” task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

At ~7:45am EDT, the crew held another teleconference via Ku- & S-band with members of the next ISS crew, Expedition 16, at Baikonur. *[These exchanges have the purpose to begin the handover process prior to the arrival on orbit of the next crew, through videocons and data exchanges between the current crew and the upcoming crew. Expedition 16 will involve Commander Peggy A. Whitson, Flight Engineers Yuri Malenchenko, Daniel M. Tani, Léopold Eyharts and Garrett E. Reisman, plus Malaysian SFP Sheikh Muszaphar Shukor for 9 days.]*

Discretionary tasks on the coming week’s U.S. “job jar” for Clay Anderson or the other crewmembers in their free time include unpacking 26P-delivered U.S. items, replacing an ER4 (EXPRESS Rack 4) light bulb, checking out SAFER (Simplified Aid for EVA Rescue) pyro valves, covering SSC (Station Support Computer) Firewire ports, and prepacking 10A return cargo.

*TVIS Update:* By a concerted Sunday effort of the crew and ground specialists, the TVIS treadmill was successfully repaired yesterday, with three new roller bearings (#6-8) installed on the starboard/forward side. Bearings #6-8 on port did not need replacement. Total time estimated for two crewmembers: 2.5 hrs per person. A 20-min. Speed Characterization Test was to be conducted by Yurchikhin today. Once TVIS engineers have analyzed these data, they will let the crew know when they are Go for TVIS exercise.

*Soyuz TMA-11/15S Status Update:* At Baikonur, preparations are on schedule for the launch of Soyuz TMA-11/15S. This morning at 5:00am Moscow time (9:00pm EDT last night) the Soyuz spacecraft was moved from the Assembly-Test Facility to the launch site where the Soyuz-FG launch vehicle with the Soyuz TMA-11 transport spacecraft was erected. Standard L-2 day countdown ops are underway (**see photographs below**).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:54am EDT [= epoch]):

Mean altitude -- 343.2 km

Apogee height -- 345.3 km

Perigee height -- 341.1 km

Period -- 91.40 min.  
 Inclination (to Equator) -- 51.63 deg  
 Eccentricity -- 0.0003081  
 Solar Beta Angle -- 28.5 deg (magnitude decreasing)  
 Orbits per 24-hr. day -- 15.75  
 Mean altitude loss in the last 24 hours -- 56 m  
 Revolutions since FGB/Zarya launch (Nov. 98) -- 50865

**>>> Timeline for 15S Launch through Docking** (as of 10/7, all times EDT):

- 15S Launch 10/10 **09:22:37am**
- Orbital Insertion 09:31:22 am
- DV1 (18.52 m/s) 12:58pm
- DV2 (8.19 m/s) 01:42pm
- DV3 (2.00 m/s) 10/11 09:28am
- USOS to RS MCS Handover 10/12 07:20am
- ISS mnvr to dock attitude 08:10am
- Soyuz Kurs-A Activation (T1) 09:18:54am
- SM Kurs-P Activation (T1) 09:20:54am
- Good Kurs-P data at 80 km 09:43:23am
- Kurs-A & Kurs-P Short Test at 15 km 10:04:23am
- Range = 9km - VHF-2 activation 10:10:43am
- Range = 8km - Soyuz TV activation 10:12:03am
- AR&D Flyaround mode start 10:29:44am
- AR&D Stationkeeping start 10:38:44am
- RGS AOS 10:39:44am
- AR&D Final Approach start 10:43:26am
- Sunset 10:48:11am
- 15S Docking at FGB nadir port 10/12 **10:52:26am**
- Soyuz hooks closed 11:12:26am
- RS to USOS MCS Handover 12:00 noon

**Significant Events Ahead** (*all dates Eastern, some changes possible*):

10/10/07 -- Soyuz TMA-11/15S launch (9:22:37am)  
 10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~10:52:30am)  
 10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:13am/6:36am)  
 10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
 10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
 11/03/07 -- STS-120/Discovery/10A undocking  
 11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
 11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
 11/14/07 -- US EVA-10  
 11/18/07 -- US EVA-11  
 12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
 12/08/07 -- STS-122/Atlantis/1E docking  
 12/15/07 -- STS-122/Atlantis/1E undocking  
 12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
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05/14/08 -- Progress M-64/29P launch  
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07/29/08 -- ATV-1 undocking (from SM aft port)  
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08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

***Soyuz TMA-11/15S Rollout and Erection – 10/8/07***





**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 10/07/07  
**Date:** Sunday, October 07, 2007 1:57:22 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/07/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for the crew except for daily housekeeping and voluntary work. Ahead: Week 25 of Increment 15.*

CDR Fyodor Yurchikhin conducted the routine maintenance of the SOZh (ECLSS/ Environment Control & Life Support System) system in the Service Module (SM), including ASU toilet facilities systems/replaceables plus the weekly collection of toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/ Moscow.

Fyodor also gathered weekly data on total operating time and activity durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's Air Revitalization Subsystem (SOGS) for reporting to TsUP.

*TVIS Failure:* The crew worked extensively on troubleshooting the TVIS (Treadmill with Vibration Isolation & Stabilization) which failed yesterday at ~3:30pm EDT while Oleg Kotov was running on it. Analysis is continuing. *[Overnight, a six-page list of troubleshooting questions was prepared by specialists and uplinked, to investigate why the running belt reportedly "came to a grinding halt" and later stopped again after a brief restart by Oleg.]*

The CDR conducted the third photo/video session preparatory to the arrival of Soyuz 15S with Malaysian SFP (Space Flight Participant) Sheikh Muszaphar Shukor Al Masrie as VC-13 (Visiting Crewmember 13). The task involved taking pictures of Malaysian sites (such as Kuching, Sibul, and Miri) using the Nikon D2X digital camera from SM window #9. More picture taking is scheduled for tomorrow. *[The images are stored from flash card, without compression ("raw"), on the RSK1 laptop, later to be copied to RSE1, for return to Earth.]*

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR/full time, FE-1/full time, FE-2), and RED resistive exerciser (FE-2).

Working from the Russian discretionary “time permitting” task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

As a second discretionary job, Kotov performed (in the morning) the regular status check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

At ~7:20am EDT, the FE-1 had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-9 laptop).

Discretionary tasks on the coming week’s U.S. “job jar” for Clay Anderson or the other crewmembers in their free time include unpacking 26P-delivered U.S. items, replacing an ER4 (EXPRESS Rack 4) light bulb, checking out SAFER (Simplified Aid for EVA Rescue) pyro valves, covering SSC (Station Support Computer) Firewire ports, and prepacking 10A return cargo.

No CEO (Crew Earth Observation) photo targets uplinked for today.

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**Significant Events Ahead** (*all dates Eastern, some changes possible*):

10/08/07 -- U.S. Holiday (Columbus Day)  
10/10/07 -- Soyuz TMA-11/15S launch (9:22:37am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~10:52:30am)  
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10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

***Have a nice and safe Columbus Day! (Respectively, a nice and safe Thanksgiving Day in Canada!)***



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/06/07  
**Date:** Saturday, October 06, 2007 4:52:00 PM  
**Attachments:** [image001.gif](#)  
[image002.gif](#)  
[image003.gif](#)  
[image004.gif](#)

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### **ISS On-Orbit Status 10/06/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- off-duty day for CDR Yurchikhin, FE-1 Kotov and FE-2 Anderson except for housekeeping and voluntary work.*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, the CDR & FE-1 performed preventive maintenance cleaning on the V3, VPkhO, VdPrK, and VPrK fan screens in the DC1 (Docking Compartment) and on the TsV2 fan grille in the FGB.

In preparation for their return to gravity, Fyodor Yurchikhin and Oleg Kotov undertook their second preliminary session of the Russian MO-5 MedOps protocol of cardiovascular evaluation in the below-the-waist reduced-pressure device (ODNT, US: LBNP) on the VELO ergometer, assisting each other in turn as CMO (Crew Medical Officer). *[The one-hour assessment, supported by ground specialist tagup (VHF) and telemetry monitoring from Russian ground sites (at 6:52am EDT & 8:28am), uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph cuff wired to the cycle ergometer's instrumentation panels. The Chibis ODNT provides gravity-*

*simulating stress to the body's cardiovascular/circulatory system for evaluation of Yurchikhin's and Kotov's orthostatic tolerance (e.g., the Gauer-Henry reflex) after several weeks in zero-G. The preparatory training generally consists of first imbibing 150-200 milliliters of water or juice, followed by a sequence of progressive regimes of reduced ("negative") pressure, set at -20, -25, -30, and -35 mmHg (Torr) for five minutes each while shifting from foot to foot at 10-12 steps per minute, while wearing a sphygmomanometer to measure blood pressure. The body's circulatory system interprets the pressure differential between upper and lower body as a gravity-like force pulling the blood (and other liquids) down. Chibis data and biomed cardiovascular readings are recorded. The Chibis suit (not to be confused with the Russian "Penguin" suit for spring-loaded body compression, or the "Kentavr" anti-g suit worn during reentry) is similar to the U.S. LBNP facility (not a suit) used for the first time on Skylab in 1973/74, although it appears to accomplish its purpose more quickly.]*

CDR Yurchikhin conducted the second photo/video session preparatory to the arrival of Soyuz 15S with Malaysian SFP (Space Flight Participant) Sheikh Muszaphar Shukor Al Masrie as VC-13 (Visiting Crewmember 13). The task involved taking pictures of Malaysian sites (such as Kelang, Kuala Lumpur, Ipoh, George Town, and Taiping) using the Nikon D2X digital camera from SM window #9. More picture taking is scheduled for tomorrow through 10/8. *[The Malaysian VC-13 onboard program itself will be performed from 10/10/07 to 10/21/07. The duration of VC-13 joint flight as part of the ISS RS (Russian Segment) is 9 days (from 10/12 through 10/21). The VC-13 program will entail –*

- *Science experiments (CIS/Cells in Space, MIS/Microbes in Space, PCS/Protein Crystallization in Space, FIS/Malaysian Food in Space, TOP/Study of Torques in Microgravity, plus three previous ESA experiments - ETD, MOP & MUSCLE);*
- *Three real-time RS-TsUP/Moscow live TV links;*
- *Five ham radio sessions;*
- *Interior photo & video imagery aboard the ISS RS;*
- *Commemorative activities; and*
- *Talks with the Malaysian cosmonaut consultative team (via Russian communications systems) twice daily, in the morning and evening.]*

For his voluntarily performed "Saturday Science" session, FE-2 Anderson again worked with the new ANITA (Analyzing Interferometer for Ambient Air) payload. *[After first switching the equipment via the ANITA user interface software from local sampling mode to non-local sampling, Clay used a hand pump and sample bags to collect two non-local ambient air samples, one from in front of the ANITA air flushing unit's gas inlet and the other from the middle of the Node, for subsequent analysis in the ER4 (EXPRESS Rack 4) ANITA drawer. Developed by ESA, ANITA is a potential next-generation trace-gas analysis system that uses a Fourier-*

*Transform Infrared (FTIR) spectrometer to determine concentrations of up to 32 different trace gases in the cabin atmosphere (measuring absorbance vs. wavelength). ANITA provides continuous, automatic air sampling from its location in ER4, taking one local sample every 6 minutes, for medical personnel during the first ten days, later for environmental specialists. Data are stored on the ANITA laptop hard drive, with a representative data set downlinked daily by ground command.]*

At ~9:05am EDT, the crewmembers held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Clay Anderson filled out the regular FFQ (Food Frequency Questionnaire), his 13<sup>th</sup>, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Fyodor Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

In the SM, the CDR performed maintenance on the Onboard Equipment Control System (SUBA) by remating cable connectors behind a wall panel (#307) to deactivate a backup contact-separation flag in the Common Power Switching Unit (BSK-U). *[The SUBA controls, monitors, and diagnoses SM systems status. It operates using sensor output signals and command radio link SM functional outputs, onboard computer system (BVS) units, SM control panels, and system relay outputs. Its software resides in the SM central computer (TsVM) and terminal computer (TVM). The BSKs are used to switch electrical power and protect electrical circuits with fuses against overloads.]*

FE-2 Kotov serviced the Lab video distribution system by exchanging the video tapes in the #1 and #2 VTRs (Video Tape Recorders) against new ones.

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2) and VELO bike with bungee cord load trainer (CDR/MO-5, FE-1/MO-5).

Later Clay transferred the crewmembers' exercise data file to the MEC (Medical Equipment Computer ) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

At ~5:20am, Clay powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), to conduct, at 5:25am, a ham radio exchange with students at the town of Anamizu, Housu-gun Ishikawa, Japan. *[The town of Anamizu is located on the Noto Peninsula and is a place abundant with nature that is surrounded by mountains and the ocean. In 1889, Percival Lowell became interested in the Noto Peninsula and visited Anamizu, which he introduced in his book titled Noto. As a commemoration of the last point on Lowell's journey, a monument was constructed and to commemorate Lowell himself, a telescope has been provided for this town with starry skies. At the end of March this past year, the nature-filled town of Anamizu was hit by the Noto Peninsula Earthquake and suffered a large amount of damage. The success of this dream project will most certainly give local citizens a sense of strength to help recover from the earthquake. "Do you have any free time?"; "What do shooting stars look like from space?"; "Can you see the forest destruction and desertification from space?"; "Can you tell when it is night or morning in space?"; "What does it smell like in the space station?"; "Do you miss your family?"; "How do you throw away trash from the space station?"; "Do raw foods get spoiled in space too?"; "Is it true that you will lose your balance after you come back from space?"; "Have you ever seen an UFO?"; "Is it possible for us to go to space without training?"]*

At 3:10pm, Anderson conducted a second ham radio session, with the Prairielands Council, Boy Scouts of America, at the Space Jamboree Camp Robert Drake (Oakwood, IL), Champaign, Illinois. *[Space Exploration and Radio Merit Badges form the core of their Space Jamboree program. Mars exploration, Moonbase design and studying the ISS are some of the things these Scouts are learning about. Pioneering skills are traditional Scouting activities, yet Science and Technology have always been at the forefront of exploration and "we are looking forward to a telebridge phone call from a modern pioneer on the edge of space exploration." "We are taught about "Leave No Trace" here, on Earth. I hear about 'space junk' and 'space trash'. How do astronauts deal with trash and 'other stuff' in space?"; "When you get back to Earth, do you ever dream that you are floating?"; "What do you like to do in your free time?"; "How did your parents react when you told them you were going into the space program?"; "What type of exercises do you have to do because of zero gravity?"; "Have you given any thought to what games we might play in space, like Harry Potter "Quidditch," for instance?"; "How do you store stuff when you have no gravity?"; "What kinds of emergencies did you train to*

handle?"]

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

Another job item on Kotov's discretionary list for today was another radiation data monitoring & logging session for flow & dose power data with the Matryoshka-R radiation payload and its LULIN-5 electronics box. Accumulated readings were recorded on a log sheet for subsequent downlink to TsUP/Moscow via the BSR-TM payload data channel.

Other discretionary tasks on this week's "job jar" for Clay or the other crewmembers in their free time include unpacking 26P-delivered U.S. items, replacing an ER4 (EXPRESS Rack 4) light bulb, checking out SAFER (Simplified Aid for EVA Rescue Onboard Training) units, deconfiguring and removing MELFI MOOCE gear, and repacking 10A return cargo.

*IWIS DTF Thruster Firings Update:* During the early-morning preparations for the planned IWIS DTF (Internal Wireless Instrumentation System/Dedicated Thruster Firing) tests, the starboard SARJ (Solar Array Rotary Joint) could not be positioned as necessary. The SARJ's Runaway FDIR (Fault Detection, Isolation & Recovery) system was inhibited and the SARJ Drive Motor was selected successfully but with a "peculiar" signature. The thruster tests (five firings each with a 4-min recovery period in free drift) could not be performed and may be rescheduled. *[For the DTF the IWIS RSUs (Remote Sensing Units) were installed by the crew in the RS (Russian Segment), - one in the SM, one in the FGB, with USOS sensors left in place. The goal of this test was/is not to excite the arrays by direct plume impingement like in past tests but to excite the arrays from their base via mechanical loads. The on-orbit data will be utilized to correlate math models utilized by structures & mechanism specialists.]*

### **Weekly Science Update (Expedition Fifteen – 24<sup>th</sup>)**

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* ALTEINO instrument continues to acquire nominally radiation levels in the SM. Memory card was exchanged on 10/4. A close-out session for this increment is planned on 10/16. During this close-out session, the ALTEINO device would be relocated to the PIRS DC1 module.

*ANITA*: All planned collections for the experimental local sampling phase of ANITA have been completed. The ground looks forward to collection of the non-local experiment samples today (10/6). ANITA will now continue to gather data for use by the Environmental Factors Office.

*BCAT (Binary Colloidal Alloy Test)*: Reserve.

*CARDIOCOG-2*: Completed.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS)*: Continuing,

*CFE (Capillary Flow Experiment)*: Reserve.

*CHROMOSOME-2 (E14 SFP)*: Completed.

*CSI-2/CGBA (CGBA Science Insert #2/Commercial Generic Bioprocessing Apparatus)*: In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2)*: Complete.

*EarthKAM (Earth Knowledge Acquired by Middle School Students)*: Next scheduled operation is 10/29-11/3.

*EMCH (Elastic Memory Composite Hinge)*: Complete.

*EPO (Educational Payload Operation) Kit C*: Planned.

*IMMUNO (Saliva Sampling)*: Second session currently planned for 10/14-16.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*: Complete.

*MISSE (Materials ISS Experiment)*: Ongoing.

*MTR-2 (Russian radiation measurements)*: Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1*: From 9/27-29, observations of the leaves of the plants in B1 were recorded in 2D as per following scenario: 8hrs light + 0-g, 8 hrs light + 1-g, 8hrs dark + 1-g. Rotor A remained static. This was done with high frequency observation of A2/A4 and B1/B3 (1 image / 5 min). During this period, roots of plants of B1 were ventilated and A2 was watered. From then on Rotor-B has been spinning at 1-g for

optimal stem growth. Lock-ups of the VPU (Video Processing Unit) on 9/30, 10/1, 10/3 & 10/5 have led to loss of some imagery, but otherwise science data continue to be collected. From 10/2, the ACS (Atmospheric Control System) system has been used in EMCS to allow adding some GN2 to keep the PPO2 below the threshold value while OGS is active in US-Lab. On 10/3, hydration was performed in B1 and roots of plants were ventilated in both B1 and A2. Further confirmation is needed, but it looks like the stem for one of the B1 plants has started to appear. If confirmed, 2D then 3D-recordings of stem circumnutation can begin.

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* The SAME team has been busy this week completing ops and analyzing data and will report on results in next week's WSS.

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION:* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*SAMPLE:* Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* n/a

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* "Clay, next week you have your last download/initialization session. You will also be changing the lithium battery and activating the I-16 CDR Actiwatch as well as changing the 9V battery in the reader. Thanks for your continued support."

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 10/3 the ground has received a total of 16,693 CEO images for review and cataloging for Increment 15. 1,670 frames were received in just the past week! "We have identified and prioritized for review those frames with camera times corresponding to the request times of the following CEO

targets: Nile River Delta, Africa; B. P. Structure, Libya; Oasis Impact Crater, Libya; Tropical Storm Karen, Atlantic Ocean; Antarctic Ice Pack; Kerguelen, S. Indian Ocean; Iceberg A22A, S. Atlantic Ocean; Patagonian Glacier, S. America; Pilcomayo River Dynamics, N. Argentina; and Mt. Ruapehu, New Zealand. *["We'll provide feedback as we work our way through these. We have already spotted your excellent IPY (International Polar Year) images of Iceberg A22A that you acquired on 10/1 (see below). Thanks for your diligence and patience in spotting this challenging and elusive target! We also appreciate both the call-down feedback we are now receiving as well as the prompt downlink of your recent imagery. There are numerous striking, high-oblique, low-light views in your latest imagery showing nice composition and creativity on your part. However, we have also noticed some inconsistency in your long lens technique with several sessions having soft focus throughout. Remember also that if you use the science window that long lens photography is almost always soft. Your recent, grand, oblique view of western Nebraska including the confluence of the North and South Platte Rivers and the famous Sand Hills will be published on NASA/GSFC's Earth Observatory website this weekend."]*

**A22A**



CEO (Crew Earth Observation) photo targets uplinked for today were S.

**Mozambique** (this region of Mozambique has received an economic stimulus from oil and gas strikes that have just come on line in the last few years. CEO imagery will be used in a country with almost no maps, to document the associated economic development [planned and unplanned] that surround oil areas. Crew was to shoot an overlapping series of images [looking right at about 45 deg] for about 45 secs), **Jebel at Tair volcano eruption** (DYNAMIC EVENT: Jebel at Tair is a tiny,



AR&D Flyaround mode start		10:29:44am
AR&D Stationkeeping start		10:38:44am
RGS AOS		10:39:44am
AR&D Final Approach start		10:43:26am
Sunset		10:48:11am
15S Docking at FGB nadir port	10/12	<b>10:52:26am</b>
Soyuz hooks closed		11:12:26am
RS to USOS MCS Handover		12:00 noon

**Significant Events Ahead** (all dates Eastern and subject to change):

10/08/07 -- U.S. Holiday (Columbus Day)  
10/10/07 -- Soyuz TMA-11/15S launch (9:22:37am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~10:52:30am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:13am/6:36am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)

04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch**

*Sputnik Celebration Update:* On 10/4, the new Sputnik monument was officially unveiled at Korolev near Moscow, shown below. Middle picture: VIP section, with Prof. Natalya Koroleva, daughter of Sergey Pavlovich in the middle. Bottom picture: Rare shot of SP Korolev’s gravesite in the Red Wall near Lenins Mausoleum



Sputnik monument



Sputnik monument unveiling (VIPs on stage, with N.Koroleva)



S.P. Korolev's burial place on Red Square.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 10/05/07

**Date:** Friday, October 05, 2007 3:02:35 PM

**Attachments:**

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**ISS On-Orbit Status 10/05/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, CDR Yurchikhin, FE-1 Kotov and FE-2 Anderson conducted another session of the Russian biomedical routine assessments PZEh-MO-7/Calf Volume Measurement and PZEh-MO-8/Body Mass Measurement (eleventh time for CDR & FE-1, eighth for FE-2), using the IM mass measurement device which Oleg Kotov afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference pints, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

Before breakfast & first exercise, CDR Yurchikhin, FE-1 Kotov and FE-2 Anderson completed another session with the Russian crew health monitoring program's medical assessment MO-9/Biochemical Urinalysis. The FE-1 stowed the Urolux hardware afterwards. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

Also before breakfast and exercise, Yurchikhin and Kotov, both assisted by FE-2, and Anderson, assisted by FE-1, also did the second part of the PHS/Without Blood Labs assessment. The MO-9 and PHS sessions concluded with the usual PHS Part 3, subjective clinical evaluation, guided by the MEC IFEP software. Subsequently, Clay closed out and stowed the PHS hardware. *[The U.S. PFE w/o Blood Lab is a monthly 1.5-hr. procedure which checks up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (cycle ergometer with vibration isolation) in the Lab. Readings are taken with the BP/ECG (blood pressure/electrocardiograph) and the HRM (heart rate monitor) watch with its radio transmitter. BP/ECG provides automated noninvasive systolic and diastolic blood pressure measurements while also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise.]*

CDR Yurchikhin supported the ground in reactivating the Elektron O<sub>2</sub> (oxygen) generator, which was turned off on 10/1 for the subsequent OGS (Oxygen Generation System) test activation. *[Reactivation was at 32 amps. As usual Fyodor monitored the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

After the recent (10/1) Vozdukh BKV valve replacement, Yurchikhin today switched the CO<sub>2</sub> (Carbon Dioxide) removal system first to automatic mode and later back to manual mode 5.

In preparation for the arrival of STS-120/10A later this month (10/25) and the berthing of Node 2/Harmony on Node 1/Unity, Anderson first prepared for CBCS (Centerline Berthing Camera System) setup, then had an additional 90 min reserved for installation and checkout of the CBCS at the Node portside hatch. *[For the installation, Clay freed up all UOP-1 (Utility Outlet Panel 1) plugs, moving the SSC9 (Station Support Computer 9) laptop's power connector to UOP-2 and powered off UOP-1 (which will be used for CBCS and stays that way through 10A).]*

For next week's (10/12) arrival of Soyuz TMA-11/15S, FE-2 Anderson installed the IWIS (Internal Wireless Instrumentation System). A test of the setup with a dedicated thruster firing is scheduled for tomorrow. *[IWIS measures structural dynamics data by means of its RSUs (Remote Sensor Units) in the SM (Service Module), FGB and Node during the Soyuz docking.]*

Yurchikhin and Kotov conducted the periodic collecting of surface samples from specific equipment and structures in the station in the Biosamples Kit A2 of the

Russian BTKh-11 Biodegradation ("*Biodegradatsiya*") experiment, for subsequent stowage in the Soyuz TMA-10/14S Descent Module for microbial analysis on Earth. Fyodor documented Oleg's activity with the Nikon D1X digital camera with SB 28DX flash attachment.

Anderson took air samples for the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries are to be replaced if necessary. *[Purpose of the 10-min. activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements.]*

The FE-2 completed the weekly 10-min. CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

Clay also performed computer maintenance, doing the regular weekly reboot of all PCS (Portable Computer System) A31p laptops.

Later, Anderson serviced the ongoing SAME (Smoke Aerosol Measurement Experiment) investigation, conducting the daily shutdown of the MSG (Microgravity Science Glovebox) facility and MLC (MSG Laptop Computer).

Additionally, the FE-2 performed the regular monthly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), inspecting the condition of harnesses, belt slats, corner bracket ropes, IRBAs (Isolation Restorative Bungee Assemblies) and gyroscope wire ropes for any damage or defects, lubricating as required plus recording time & date values.

The two Russian crewmembers again had about one hour each for their personal preparations for their Soyuz 14S departure on 10/21, going by an uplinked "End of Expedition 15 Cleanup" list. *[Items packed for return on Soyuz are to be reported in the IMS. Other contents of their personal bags, such as clothing, can be trashed in a KBO-M container. Some equipment, e.g., generic US clothing, can be restowed (in PMA-1).]*

Preparatory to the arrival of Soyuz 15S with Malaysian SFP (Space Flight Participant) Sheikh Muszaphar Shukor Al Masrie as VC-13 (Visiting Crewmember 13), Yurchikhin reviewed an uplinked listing of VC-13 oriented photo/video shots, then took pictures of Malaysian sites using the Nikon D2X digital camera from SM window #9. More picture taking is scheduled for tomorrow through 10/8. *[The*

*Malaysian VC-13 onboard program itself will be performed from 10/10/07 to 10/21/07. The duration of VC-13 joint flight as part of the ISS RS (Russian Segment) is 9 days (from 10/12 through 10/21). The VC-13 program will entail –*

- Science experiments (CIS/Cells in Space, MIS/Microbes in Space, PCS/Protein Crystallization in Space, FIS/Malaysian Food in Space, TOP/Study of Torques in Microgravity, plus three previous ESA experiments - ETD, MOP & MUSCLE);*
- Three real-time RS-TsUP/Moscow live TV links;*
- Five ham radio sessions;*
- Interior photo & video imagery aboard the ISS RS;*
- Commemorative activities; and*
- Talks with the Malaysian cosmonaut consultative team (via Russian communications systems) twice daily, in the morning and evening.]*

Fyodor completed the daily routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), with the regular insert replacements in its toilet system (ASU).

The CDR also updated/edited the standard daily IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR/ full time, FE-1/ full time, FE-2) and RED resistive exerciser (FE-2).

Later Clay transfers the crewmembers' exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

Clay tagged up with ground specialists to discuss the imagery resulting from his standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training on 10/3 where he used the DCS-760 digital still camera with 400 & 800mm lenses at SM windows 6 & 8 (facing in flight direction) to take CEO (Crew Earth Observations) target imagery with manual focusing only. *[The RPM drill prepares crewmembers for the bottom-side mapping of the Orbiter at the arrival of the Shuttle (STS-120/10A next). During the RPM at ~600 ft from the station, the "shooters" have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on Discovery, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle pilot.]*

At ~4:15am EDT this morning, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~5:45am, Fyodor and Oleg linked up with TsUP stowage specialists via S-band to conduct the weekly IMS tagup, discussing stowage issues and equipment locations.

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio will be conducted at ~4:40pm.

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

As a second discretionary job, Kotov performed (in the morning) the regular status check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

Another voluntary task from the Russian list for Yurchikhin was the periodic computer network audit, listing battery status & IDs, operational issues, floppy drive serial numbers and stowage locations for all Russian laptops (RSS1, RSS2, RSK1, RSE1, RSE-Med, TP2 and Laptop 3). On RSS1, Fyodor also changed/updated four icons for BSPN (Payload Server) and BSMM (Payload Matching Unit/computer) operation.

Other discretionary tasks on this week's "job jar" for Clay or the other crewmembers in their free time include unpacking 26P-delivered U.S. items, replacing an ER4 (EXPRESS Rack 4) light bulb, checking out SAFER (Simplified Aid for EVA Rescue Onboard Training) units, deconfiguring and removing MELFI MOOCE gear, and prepacking 10A return cargo.

*Sputnik Celebration Update:* Yesterday (10/4), the crew participated in two PAO TV events in observance of the 50<sup>th</sup> anniversary of the launch of Sputnik 1, one with greetings to MATI, the K.E. Tsiolkovsky Russian State Engineering University ("... specialists trained at MATI have made a significant contribution in space exploration... It is your work that ensures steady reliable launches, successful



trying for detailed views with the long lens settings), **Mt. Kilimanjaro, Kenya** (Mount Kilimanjaro is a renowned volcanic peak of eastern equatorial Africa. It is situated in northeastern Tanzania near the border with Kenya. At 19,341 feet, it is the highest peak in Africa and sustains a small icecap with glaciers which are under study as indicators of climate variations. ISS pass was near-nadir in mid-afternoon sun with clouds expected in the lower elevations. Trying for detailed views of the icecap), and **Jebel at Tair Eruption** (DYNAMIC EVENT: Jebel at Tair is a tiny, dark-colored volcanic island in the southeastern Red Sea near 15.55N 41.82E. On September 30, 2007, this small dormant volcano erupted late in the day, with what one observer described as a "giant light show", spewing lava and hurling an ash cloud hundreds of meters into the air. According to the Global Volcanism network, the 3-km-wide island is the emergent summit of a stratovolcano that rises from a 1,200 m depth in the south-central Red Sea. Explosive eruptions were last reported in the 18<sup>th</sup> and 19<sup>th</sup> centuries. ISS pass was in very late afternoon light and well to the SE of the target. Looking well left of track and try for high oblique, contextual views of the southeastern Red Sea area looking perhaps for a volcanic plume).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:21am EDT [= epoch]):

Mean altitude -- 343.4 km

Apogee height -- 345.6 km

Perigee height -- 341.2 km

Period -- 91.40 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0003255

Solar Beta Angle -- 39.7 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.75

Mean altitude loss in the last 24 hours -- 71 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50818

**Significant Events Ahead** (all dates Eastern and subject to change):

10/08/07 -- U.S. Holiday (Columbus Day)

10/10/07 -- Soyuz TMA-11/15S launch (9:22:37am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~10:52:30am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:13am/6:36am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate

from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch

10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)

04/??/09 -- **Six-person crew on ISS**

04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/04/07  
**Date:** Thursday, October 04, 2007 3:03:25 PM  
**Attachments:** [image001.gif](#)

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**ISS On-Orbit Status 10/04/07**

***Fifty Years of Space Flight!***  
***Bolshoe vam spasibo, Sergey Pavlovich!***

*(see below).*

All ISS systems continue to function nominally, except those noted previously or below.

CDR Yurchikhin and FE-1 Kotov set up the equipment for their fourth session with the Russian experiment DYKHANIE (“respiration”, “breathing”), tagged up with ground specialists and conducted the session, first the CDR, later the FE-1, afterwards closing down and stowing the equipment. *[Dykhaniye-1 gear uses two belts (PG-T/thoracic, PG-A/abdominal), a calibrator, resistor, mouthpiece, etc., to study fundamental physiological mechanisms of the external breathing function of crewmembers under long-duration orbital flight conditions. During the experiment, physiological measurements are taken and recorded with a pneumotachogram, a thoracic pneumogram, an abdominal pneumogram, and pressure data in the oral cavity. All experimentally derived plus salient environmental data along with personal data of the subject are recorded on PCMIA card for return to the ground at end of the Expedition. Objectives include determining the dynamics of the relationship between thoracic (pectoral) and abdominal breathing function reserves and their realization potential during spontaneous breathing, the coordinated spontaneous respiratory movements in terms of thoracic and abdominal components of volumetric, time & rate parameters of spontaneous respiratory cycle, identification of the features of humoral-reflex regulation of breathing by dynamics of ventilation sensitivity of thoracic and abdominal components to chemoreceptor stimuli, etc. Overall, the experiment is intended to provide a better understanding of the basic mechanisms of pulmonary respiration/gas exchange gravitational relations of cosmonauts.]*

FE-2 Anderson configured the OUM-PFE (Oxygen Uptake Measurement - Periodic Fitness Evaluation) equipment on the HRF-2 (Human Research Facility 2) rack, including the HRF PFM/PAM (Pulmonary Function Module/Photoacoustic Analyzer Module), BP/ECG (Blood Pressure/Electrocardiograph), Mixing Bag System and GDS (Gas Delivery System), then ran the data collection session on himself on the CEVIS cycle ergometer according to protocol, with Oleg Kotov acting as OUM-PFE operator. *[The operations were documented with photo and video. In closing out, Clay updated the evaluation protocol, deactivated & stored the gear, including photo/video equipment, and turned off the OUM-PFE laptop.]*

Later Anderson unstowed and prepared AMP (Ambulatory Medical Pack) and ALSP (Advanced Life Support Pack) equipment for another set of PHS (Periodic Health Status)/Without Blood Lab and MO-9 Urinalysis sessions scheduled for tomorrow.

Performing the periodic (generally monthly) service of the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), Yurchikhin removed the PCMCIA memory card #932 from the AST spectrometer's slot and copied the accumulated data for subsequent downlinking via OCA. Card 932 was then bagged for return to Earth and PCMCIA card 935 inserted to continue AST ops.

Kotov collected the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

The CDR completed the daily routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), with the regular insert replacements in its toilet system (ASU).

Fyodor today also continued the extended leak checking of the spare BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator by charging the unit once again with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#23). The last test pressurization was done by Yurchikhin on 9/14. *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

Clay Anderson updated/edited the standard daily IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew conducted an in-depth review of the planned science program of the next SFP (Space Flight Participant), VC-13 Sheikh Muszaphar Shukor Al Masrie from Malaysia, followed by a tagup with ground specialists to discuss details. *[The Malaysian VC-13 program is performed from 10/10/07 to 10/21/07. The duration of VC-13 joint flight as part of the ISS RS (Russian Segment) is 9 days (from 10/12 through 10/21). The VC-13 program will entail –*

- *Science experiments (CIS/Cells in Space, MIS/Microbes in Space, PCS/Protein Crystallization in Space, FIS/Malaysian Food in Space, TOP/Study of Torques in Microgravity, plus three previous ESA experiments - ETD, MOP & MUSCLE);*
- *Three real-time RS-TsUP/Moscow live TV links;*
- *Five ham radio sessions;*
- *Interior photo & video imagery aboard the ISS RS;*
- *Commemorative activities; and*
- *Talks with the Malaysian cosmonaut consultative team (via Russian communications systems) twice daily, in the morning and evening.]*

Reviewing an uplinked listing of return cargo items to be brought down on their Soyuz ship, Fyodor and Oleg tagged up with ground specialists to discuss stowage issues for the return on 14S on 10/21.

The two Russian crewmembers again had about one hour each for their personal preparations for their departure on 14S, going by an uplinked “End of Expedition 15 Cleanup” list. *[Items packed for return on Soyuz are to be reported in the IMS. Other contents of their personal bags, such as clothing, can be trashed in a KBO-M container. Some equipment, e.g., generic US clothing, can be restowed (in PMA-1).]*

Clay Anderson had time set aside for troubleshooting the IV-PDS (Intravehicular Particle directional Spectrometer) using the MEC (Medical Equipment Computer) laptop and a data cable obtained from the TEPC (Tissue Equivalent Proportional Counter) radiation measurement equipment.

The FE-2 tagged up with the EVA specialists to discuss details of the 10A spacewalk timelines.

Anderson also continued his support of the MELFI (Minus-Eighty Laboratory Freezer for ISS) facility. *[Today, Clay removed the MOOCE (MELFI On-Orbit Characterization Experiment) cable from Dewar 2 for better access and installed a door bolt on the Dewar. He then moved the MOOCE tray from the -95 deg Dewar 2 into the +2 deg Dewar 4 (to allow the tray to warm up prior to touching it for deconfiguration).]*

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2/OUM), TVIS treadmill (CDR/full time, FE-1/ full time,) and RED resistive exerciser (FE-2).

Later Clay transferred the crewmembers' exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

Other discretionary tasks on this week's "job jar" for Clay or the other crewmembers in their free time include unpacking 26P-delivered U.S. items, replacing an ER4 (EXPRESS Rack 4) light bulb, checking out SAFER (Simplified Aid for EVA Rescue Onboard Training) units, deconfiguring and removing MELFI MOOCE gear, and prepacking 10A return cargo.

*OGS Update:* The U.S. OGS (Oxygen Generation System) testing is continuing successfully, to run through approximately the end of the week. This operation is scheduled approximately tri-monthly to ensure the system remains healthy.

*RS Thermal Control System (STR) Update:* After yesterday's successful pump replacement using a pump assembly from KOB-1, KOB-2 is currently functioning with all four pumps and KOB-1 has two of its usual four pumps working.

*OpsLAN Clean-up Update:* Clay's job yesterday of clearing out old OpsLAN (Operations Local Area Network) gear remaining after the recent ISL/JSL (Integrated Station LAN/Joint Station LAN) transition turned out to require considerably more time than the estimated 45 min for cleaning and stowing coax cabling. More time for removing old cabling needs to be scheduled for the crew.

*MT Move Update:* All systems performed nominally in yesterday's checkout "drive" of the Mobile Transporter (MT). The Robotics Flight Control Team successfully commanded MT translation from WS4 (Worksite 4) to WS8 for Flight 10A pre-launch checkout in preparation for the P6 truss relocation. After confirming redundant power and data connectivity to the MRS MBS (Mobile Remote Servicer/ Mobile Base System) at WS8, the MT was translated back to WS4, the initial

position for Flight 10A docked operations.

CEO (Crew Earth Observation) photo targets uplinked for today were **Perth, Australia** (*Perth is the capital of Western Australia with a population of 1,507,900 [Dec. 2006 est.]. This "megacity" is located on the Swan River along the coast of Western Australia. Detailed mapping of the city is requested*), **S. Mozambique** (*the interest in this rural site is to document rapid change. While most of Africa stagnates economically, extraction of Mozambique's huge hydrocarbon reserves has started to spark economic development along a major transportation route to the interior. Detailed baseline/"pre-change" imagery is therefore requested to reveal styles of land use change, patterns that are probably new in a globalizing world. As with post-Soviet conditions in eastern Europe, remote sensing is suddenly one of the best ways to track change because collection of statistics either never existed, or has declined or disappeared. Requested was a mapping strip with the 400 mm lens*), **Patagonian Glaciers** (*from the ISS, seasonal, colored images of glaciers will provide valuable information about the area extent of the glacial ice and surface snows (or equilibrium line) on the glaciers. Looking towards the eastern side of the ice field. Previous ISS crews have done a great job in documenting the larger glaciers. The ground requested that the crew focus on documenting the smaller glaciers*), and **High Central Andean Glaciers** (*ISS had a pass that took it over the central axis of the Andes mountains. This area is usually cloud covered but for this day it appeared to be about as cloud free as it gets. The crew may still have seen popcorn cumulus clouds but that should not have inhibited them from seeing the glaciers. The ground recommended to look toward the southern Andes to document the extent of the glaciers*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:58am EDT [= epoch]*):

Mean altitude -- 343.4 km

Apogee height -- 345.6 km

Perigee height -- 341.3 km

Period -- 91.40 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0003163

Solar Beta Angle -- 42.7 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.75

Mean altitude loss in the last 24 hours -- 55 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 50802

**Significant Events Ahead** *(all dates Eastern and subject to change):*

10/08/07 -- U.S. Holiday (Columbus Day)  
10/10/07 -- Soyuz TMA-11/15S launch (9:22:37am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~10:53am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:13am/6:36am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)

08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 10/03/07  
**Date:** Wednesday, October 03, 2007 4:16:43 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/03/07**

All ISS systems continue to function nominally, except those noted previously or below.

In the Service Module (SM), CDR Yurchikhin performed a 2-hr IFM (inflight maintenance) on the Russian STR thermal control system's KOB-2 loop to remove a replaceable unit (BS) with an electric pump (ENA) of the replaceable pump panel 4SPN1, and to replace it with a BS scavenged from an older pump assembly ORU (on-orbit replaceable unit, 3SPN1). The failed BS assembly and a second BS (N2) from 3SPN1 were to be trashed.

FE-1 Kotov unstowed the REFLOTRON-4 biomedical blood analyzer and conducted a health check on the instrument using the standard measuring strips. *[Earlier Reflotron versions have operated already on space station Mir. The instrument determines clinical data from blood samples collected from the subject's finger. Using various reagent tabs, the blood is tested with strips (KPI) for such parameters as hemoglobin, glucose, bilirubin, amylase, uric acid, triglycerides, urea, creatinin, cholesterol, etc. The tubes with blood samples are then temporarily kept cool for subsequent analysis. Reflotron-4 uses 40 W of power, supplied by the SM's electrical system.]*

Continuing his support of the MELFI (Minus-Eighty Laboratory Freezer for ISS) facility, FE-2 Anderson swapped box modules/trays in Dewars 2 & 3, to consolidate samples of the past NUTRITION experiment into the same dewar. *[This makes Double Coldbag packing quicker and more efficient on 10A. Samples are most vulnerable to damage during bag packing while they are exposed to ambient air, so efficient packing is crucial to preserving science.]*

The FE-2 also performed the daily assist of the ongoing SAME (Smoke Aerosol Measurement Experiment) investigation, powering up the MSG (Microgravity Science Glovebox) facility and MLC (MSG Laptop Computer). *[Carousel #5 is*

*mounted in the WV (Work Volume), to be run tomorrow and Friday. This will end the SAME experiment. The hardware will be disassembled and removed during the docked period, and all items except for the alcohol wick will be returned to Earth on 10A.]*

Using the MAS (Microbial Air Sampler) kit, Anderson gathered air samples in Lab, Node & SM for bacterial and fungal analysis in Petri dishes and stowed them for return to Earth on 10A. Later, Anderson collected surface sample swabs in Lab & Node for cultivation/incubation with the EHS SSK (Environmental Health Systems/ Surface Sample Kit). *[The MAS sampling analysis is performed once per month for the first three months, and once every three months thereafter. Bacterial and fungal air samples are taken at two locations in each module. The colony growth on the sampling slides will usually (not this time) be analyzed on board after five days of incubation in 4 Petri dishes. As done for MAS, SSK sampling is performed once per month for the first three months that a module is on orbit and once every three months thereafter. Bacterial and fungal samples are taken at two locations in each module, with the prime site in the Lab being the air supply diffuser at the LAB1P5 rack. The colony growth on the 10 sampling slides will be analyzed after five days of incubation. For onboard visual analysis of media slides from SSK, MCDs (Microbial Capture Devices) from WMK (Water Monitoring Kit), coliform detection bags from MWAK (Microbial Water Analysis Kit), and Petri dishes from MAS, the crew has a procedure for visual inspection of samples for bacterial and fungal colony growths after appropriate incubation periods.]*

The FE-2 also completed the visual “T+2 Day” microbial (bacterial & fungal) analysis of the Week 24 potable water samples, collected on 10/1 from the SRV-K hot tap and two CWC (Contingency Water Containers) specimens and processed on board with the MCDs (Microbial Capture Devices).

Oleg Kotov, assisted in part by the CDR, restored access to the Progress M-61/26P cargo ship which had been closed off for the Soyuz relocation. *[After the obligatory 1-hr. Progress/DC1 interface leak check, Oleg opened the DC1-SU (vestibule) and Progress-SU transfer hatches, rigidized the link-up with the QD (quick release) screw clamps (BZV), deactivated the spacecraft and installed the ventilation air duct. 26P will remain docked at the “Pirs” module until late in December.]*

After the 26P BZV clamps installation, the MT (Mobile Transporter) was commanded from the ground to translate from WS4 (Worksite 4) to WS8 and back to WS4. For the time before BZV installation and during the MT translation, Russian thrusters were inhibited (from 9:10am to 3:16pm EDT).

As part of the job of clearing out old OpsLAN (Operations Local Area Network) gear, remaining after the recent ISL/JSL (Integrated Station LAN/Joint Station LAN)

transition, Anderson had ~45 min reserved for cleaning and stowing coax cabling.

Clay also prepared an SSC (Station Support Computer) laptop for return on mission 10A. *[The old SSC Router shell was deployed as new SSC5 and the previous SSC5 shell was deconfigured, labeled and staged for transfer to the Shuttle for earth return.]*

In preparation for another PFE/OUM (Periodic Fitness Evaluation/Oxygen Uptake Measurement) data collection session tomorrow, the FE-2 set up equipment on the HRF-2 (Human Research Facility 2) rack, including the HRF PFM/PAM (Pulmonary Function Module/Photoacoustic Analyzer Module), BP/ECG (Blood Pressure/ Electrocardiograph), Mixing Bag System and GDS (Gas Delivery System) and CEVIS cycle.

Fyodor completed the daily routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), with the regular insert replacements in its toilet system (ASU), and today also conducted the periodic checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM-to-DC1 (22P) tunnel, and the SM-to-DC1, FGB-to-Node and FGB-to-Soyuz passageways.

Oleg updated/edited the standard daily IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Anderson conducted the periodic status checkup & filter inspection of the running CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to Earth.]*

Clay also performed another standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, using the DCS-760 digital still camera with 400 & 800mm lenses at SM windows 6 & 8 (facing in flight direction) to take CEO (Crew Earth Observations) target imagery with manual focusing only. Afterwards, the obtained OBT images were downlinked to the ground for analysis. *[The RPM drill prepares crewmembers for the bottom-side mapping of the Orbiter at the arrival of the Shuttle (STS-120/10A next). During the RPM at ~600 ft from the station, the "shooters" have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on Discovery, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle pilot.]*

The two Russian crewmembers again had about one hour each for their personal preparations for their departure on Soyuz 14S on 10/21, going by an uplinked "End of Expedition 15 Cleanup" list. *[Items packed for return on Soyuz are to be reported in the IMS. Other contents of their personal bags, such as clothing, can be trashed in a KBO-M container. Some equipment, e.g., generic US clothing, can be restowed (in PMA-1).]*

Clay, who remains on board after 14S departure, also had another 40 min reserved for prepacking/staging cargo for return on 10A.

The FE-1 performed the periodic data collection and downlink on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse.

At 4:35am, FE-2 Anderson conducted the periodic VHF1 emergency communications check over NASA's VHF (Very High Frequency) sites, talking with Houston/Capcom and Moscow/GLAVNI (TsUP Capcom) in the normal fashion via VHF radio from a handheld microphone and any of the U.S. segment ATUs (audio terminal units). *[Purpose of the test is to verify signal reception and link integrity, and to ensure minimum required link margin during emergency (no TDRS) and special events (such as a Soyuz relocation).]*

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR/2 hrs, FE-1/2 hrs, FE-2) and RED resistive exerciser (FE-2), with Fyodor's and Oleg's regimen reduced today to 2 hrs each.

Later Clay transferred the crewmembers' exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

With CDRA (Carbon Dioxide Removal Assembly) deactivated and cooling no longer required, Anderson disconnected the LTL (Low Temperature Loop) jumper of the ITCS (Internal Thermal Control System) from the CDRA rack.

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

As a second discretionary job, Kotov performed (in the morning) the regular status check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

Other discretionary tasks on this week's "job jar" for Clay or the other crewmembers in their free time include unpacking 26P-delivered U.S. items, replacing an ER4 (EXPRESS Rack 4) light bulb, checking out SAFER (Simplified Aid for EVA Rescue Onboard Training) units, deconfiguring and removing MELFI MOOCE gear, and repacking 10A return cargo.

*OGS Update:* The U.S. OGS (Oxygen Generation System) was successfully activated yesterday in at the 25% production rate, to be then moded to 50%. OGS will run until its water supply is depleted (approximately 5 days). This is the second activation of OGS. The system was last activated and checked out in July 2007.

CEO (Crew Earth Observation) photo targets uplinked for today were **Roter Kamm Impact Crater** (*Roter Kamm impact crater is about 2.5 km in diameter and about 130 m deep. The crater was formed by the impact of an asteroid about 300 m in diameter. The crater interior is covered in thick sand deposits. This is a relatively young impact crater, dated at about 3.7 million years*), **Patagonian Glaciers** (*the weather was best towards the southern end of the Southern Patagonian Ice Field. This Ice Field is the third biggest extension of continental ice after the Antarctica and Greenland Ice Fields. Documenting extent of the large and small glaciers along your orbit track*), and **Lake Poopo, Bolivia** (*lowering and rising of water levels in Lake Poopo give indications of short-term regional climate fluctuations. Lake Poopo is a large saline lake located in a shallow depression in the Altiplano Mountains in Bolivia. The water level in this lake is highly variable because it lacks any major outlet and it has a mean depth of no more than 3 m. Therefore, even small regional climate variations can have an impact on the appearance of the lake. Trying to capture the entire lake in one frame. Lake Poopo was right of track. Lake Titicaca is a larger lake to the left of track*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:49am EDT [= epoch]*):

Mean altitude -- 343.5 km

Apogee height -- 345.6 km

Perigee height -- 341.5 km

Period -- 91.41 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0003049

Solar Beta Angle -- 45.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.75

Mean altitude loss in the last 24 hours -- 53 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50786

**Significant Events Ahead** (*all dates Eastern and subject to change*):

10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**

10/08/07 -- U.S. Holiday (Columbus Day)

10/10/07 -- Soyuz TMA-11/15S launch (9:22:37am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~10:52:30am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:13am/6:36am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis/1E undocking

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**

02/06/08 -- Progress M-62/27P undocking

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- ATV-1 docking (SM aft port)

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour/1J/A undocking

04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 10/02/07  
**Date:** Tuesday, October 02, 2007 1:17:45 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/02/07**

All ISS systems continue to function nominally, except those noted previously or below.

Yurchikhin and Kotov, assisting each other in turn, conducted another session with the biomedical protocol KARDIO-ODNT (MBI-5), an extensive cardiovascular test of human pericardium (heart muscle) activity as well as of primary parameters of central and regional blood circulation at rest and under the effect of lower body negative pressure (LBNP, Russian: ODNT). Later, Oleg Kotov also undertook the MedOps MO-4 orthostatic hemodynamic endurance test with the ODNT/Chibis suit in preparation for his return to gravity on 10/21, assisted by the CDR. *[The Chibis provides gravity-simulating stress to the body's cardiovascular/circulatory system for evaluation of Fyodor's and Oleg's orthostatic tolerance (e.g., the Gauer-Henry reflex) after 24 weeks in zero-G. The MBI-5 protocol again consisted of first imbibing 150-200 milliliters of water or juice, followed by a sequence of progressive regimes of reduced ("negative") pressure, set at -25, -30, -35 and -40 mmHg for five minutes each, while shifting from foot to foot at 10-12 steps per minute. The body's circulatory system interprets the pressure differential between upper and lower body as a gravity-like force pulling the blood and body fluids "down". MBI-5 data output include blood pressure readings with the Tenzoplus Sphygmomanometer, today without telemetry data monitoring but reporting of heart rate and blood pressure to TsUP-Moscow.]*

FE-1 Kotov performed the periodic O<sub>2</sub> sensor adjustment on the Russian IK0501 gas analyzer, with tagup support provided by ground specialists as necessary. *[IK0501 is an automated system for measuring CO<sub>2</sub>, O<sub>2</sub>, and H<sub>2</sub>O in the air as well as the flow rate of the gas being analyzed.]*

FE-2 Anderson worked on the RED (Resistive Exercise Device), replacing its pulley

cables with new ones after ground analysis showed cable life has expired. The canisters were then re-calibrated. *[One of the fasteners on the bottom plate of the RED, reported by Yurchikhin recently as being almost completely failed, was removed and discarded. The subsequent calibration by Clay allows accurate execution of exercise protocol objectives. Upon receipt of the results of the calibration data, ground specialists review the data and, assuming favorable engineering analysis, give the crew a GO for their RED exercise session. Calibration of the load settings of the pulley cans is performed with an on-orbit calibration kit with a special calibration tool and steel handles.]*

Clay Anderson supported the ground-commanded operation of the U.S. OGS (Oxygen Generation System) starting at 10:20am, by configuring the OGS rack (Lab1P1) for powering up from UOP3 (Utility Outlet Panel 3), removing protective Velcro squares from around the O<sub>2</sub> outlet port, followed by installing and activating the WDS (Water Delivery System) pump. *[OGS will run for 24 hrs. With overrides in place, it will be commanded to shut down and restart to verify that an off-nominal shutdown can recover. The Russian Elektron O<sub>2</sub> generator was turned off yesterday in preparation for the OGS activation; it will be reactivated on 10/5.]*

Afterwards, the FE-2 took three acoustic noise readings each before & after OGA pump activation in front of the OGS rack, using the SLM (Sound Level Meter), and later transferring the acoustic data to the MEC (Medical Equipment Computer)

Continuing his support of the MELFI (Minus-Eighty Laboratory Freezer for ISS) facility and preparing for the deconfiguration of the MOOCE (MELFI On-Orbit Characterization Experiment) and Double Coldbag packing activity during 10A, Anderson transferred the TROPI (Study of Novel Sensory Mechanism in Root Phototropism) sample from the MOOCE tray in Dewar 2 to another location. *[Background: The MOOCE tests last year were designed to characterize the MELFI thermal environment. The MOOCE tray contains wires, sensors, thermocouples, and other temperature measuring equipment to support the MELFI Commissioning tests that were completed in July last year.]*

The two Russian cosmonauts continued their personal preparations for their departure on Soyuz 14S on 10/21, going by an uplinked "End of Expedition 15 Cleanup" list. *[Items packed for return on Soyuz are to be reported in the IMS. Other contents of their personal bags, such as clothing, can be trashed in a KBO-M container. Some equipment, e.g., generic US clothing, can be restowed (in PMA-1).]*

Clay also had another 1.5 hrs reserved for prepacking/staging cargo for return on 10A.

Oleg conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Fyodor updated/edited the standard daily IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

CDR Yurchikhin supported the ground in an interesting scientific research experiment by mounting the geophysical GFI-1 Relaksatsiya ("relaxation") spectroscopic video equipment at Service Module (SM) window #1 (port-side crew cabin) and later observing ionospheric luminance at an altitude of 300 km above the Russian Sura Ionospheric Heating Facility. *[For the experiment, the ISS will be maneuvered to observation attitude by RS (Russian Segment) thruster firings at ~2:35pm EDT, for which ISS attitude control authority will be handed over to the RS MCS (Motion Control System) at 2:25pm, to be returned to USOS (US Segment) CMG momentum management at 3:05pm. The Sura Ionospheric Heating Facility, located near the small town of Vasilsursk about 100 km eastward from Nizhny Novgorod, is a laboratory for ionosphere research, capable of radiating about 190 Megawatt of effective power (ERP) on short waves (4.5-9.3 MHz). The facility is operated by the Radiophysical Research Institute NIRFI in Nizhny Novgorod. The Sura facility was commissioned in 1981. Using this facility, Russian researchers achieved extremely interesting results regarding the ionosphere behavior and discovered the effect of generation of low-frequency emission at the modulation of ionosphere current.]*

At ~11:20am EDT, the crew participated in a PAO TV "Open Class" session with school children at TsUP-Moscow in Korolev, a joint project of Russian Federal Space Agency "Roskosmos" and the RF Ministry of Education & Science dedicated to the 50<sup>th</sup> Anniversary of the first man-made Earth's satellite launch, broadcast live on TV Channel 24 "Vesti". *[Participating in the Q&A exchange between students and ISS crew were S. B. Ivanov (first Deputy Chairman of the Russian Federal Government), A. N. Perminov (Director of Roskosmos), representatives of Roskosmos, managers of TsNIIMASH (TsUP's home), TsUP Flight Director V. A. Solovyov, and the student winners of the Space Olympiads. Ivanov and Perminov opened the live televised broadcast.]*

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2) and RED resistive exerciser (FE-2), with Fyodor's and Oleg's regimen reduced today to 1 hr. each because of the ODNT training.

Later today, Clay will transfer the crewmembers' exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

Other discretionary tasks on this week's "job jar" for Clay or the other crewmembers in their free time include unpacking 26P-delivered U.S. items, replacing an ER4 (EXPRESS Rack 4) light bulb, checking out SAFER (Simplified Aid for EVA Rescue Onboard Training) units, deconfiguring and removing MELFI MOOCE gear, and prepacking 10A return cargo.

*Saturday Science Preview:* For next weekend's Saturday Science, Clay has selected another session with the ANITA (Analyzing Interferometer for Ambient Air) experiment, taking a non-local air sample from another station location (pumped by hand into a sample bag) for subsequent analysis in the ER4 ANITA drawer.

*26P Fuel Transfer:* TsUP today performed transfer of remaining fuel from Progress 26 to SM tanks.

*Vozdukh Update:* After yesterday's BVK-1 valve replacement, the Vozdukh CO<sub>2</sub> removal system is stable, running nominally.

*KURS Testing:* TsUP is scheduled to conduct remote standard 6-month tests of the automatic KURS rendezvous & docking system from the SM PkhO (Work Compartment) side, tonight for the DC1 (Docking Compartment), tomorrow for the FGB.

CEO (Crew Earth Observation) photo targets uplinked for today were A22A (IPY [International Polar Year] *Dynamic Event*. *Cloud cover was still light in the region of ISS overpass, and may have allowed for sighting and photography of the fragmenting iceberg A22A. Looking to the left of track as the station began its ascending pass towards Africa for the iceberg. Satellite data acquired on September 24 indicated that the iceberg has split into two major fragments and the crew's feedback from last week confirms this*), and Patagonian Glaciers (*Two passes today. ISS orbit took the crew over the southern end of the Patagonian ice*

*field. Looking towards the east half of the ice field and photo document the extent of the glaciers, including O'Higgins, Grey and Tyndall in Chile).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:28am EDT [= epoch]*):

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Apogee height -- 345.6 km

Perigee height -- 341.6 km

Period -- 91.41 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0002999

Solar Beta Angle -- 47.1 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.75

Mean altitude loss in the last 24 hours -- 53 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50770

**Significant Events Ahead** (*all dates Eastern and subject to change*):

10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**

10/08/07 -- U.S. Holiday (Columbus Day)

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~11:00am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis/1E undocking

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1 (1<sup>st</sup> U.S. satellite on Redstone rocket)**  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 10/01/07  
**Date:** Monday, October 01, 2007 1:42:57 PM  
**Attachments:**

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### **ISS On-Orbit Status 10/01/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 24 of Increment 15.*

Today's crew activities began with the routine checkup of DC1 (Docking Compartment) circuit breakers and fuses by CDR Yurchikhin and FE-1 Kotov. *[The monthly checkup in the "Pirs" DC1 looks at AZS circuit breakers on the BVP Amp Switch Panel (they should all be On) and the LEDs (light-emitting diodes) of 14 fuses in Fuse Panels BPP-30 & BPP-36.]*

After the two cosmonauts had completed the periodic (monthly) functional closure test of spare emergency vacuum valves (AVK) for the Vozdukh, Kotov proceeded to remove & replace the BVK-1 vacuum valve of the CO<sub>2</sub> scrubber which in the last few days exhibited offnominal performance. Oleg finished by re-connecting the subsystem to the BITS2-12 onboard measurement telemetry system for ground monitoring. *[The change was logged in the IMS (Inventory Management System), and the out-of-lifetime BVK will be returned to the ground for analysis. The AVKs are critical because they close the Vozdukh's vacuum access lines in the event of a malfunction in the regular vacuum valves (BVK) or a depressurization in the Vozdukh valve panel (BOA). Access to vacuum is required to vent CO<sub>2</sub> during the regeneration of the absorbent cartridges (PP). During nominal operation, the AVK valves remain open.]*

Yurchikhin meanwhile worked in the FGB, removing & replacing a second-string electronic program-logic control assembly (UPLU-2) with a new spare. The activity was supported by ground specialist tagup.

In preparation of the berthing of Node 2/"Harmony" during the 10A docked period later this month, FE-2 Anderson unlatched the port hatch of the Node 1/"Unity".

Yurchikhin underwent his first session of the biomedical protocol KARDIO-ODNT (MBI-5), an extensive cardiovascular test of human pericardium (heart muscle) activity as well as of primary parameters of central and regional blood circulation at rest and under the effect of lower body negative pressure (LBNP, Russian: ODNT). The test was controlled from TsUP-Moscow by a biomed specialist via VHF over RGS (Russian ground site) comm window. FE-1 Kotov assisted Yurchikhin during the procedure. *[The LBNP, generated by a specially designed Chibis suit (PVK), applies suction on the lower body ranging from 10 to 60 mm Hg, thereby exerting a functional loading roughly equivalent to 10-60 kg of force on the musculoskeletal system to test the body's adaptation to prolonged exposure to microgravity. After an initial setup period, during which Oleg attached a large number of electrodes to Fyodor's head, body and extremities, cardiographic readings on the oscilloscope of the Gamma-1M medical complex were taken during two RGS comm passes, first without, then with the Chibis suit.]*

In preparation for the upcoming U.S. OGS (Oxygen Generation System) activation, Oleg Kotov powered down the Elektron-VM oxygen (O<sub>2</sub>) generator, safety-purging its BZh Liquid Unit with nitrogen (N<sub>2</sub>) at 0.65 kg/cm<sup>2</sup> via its KE3 and VN3 valves.

Afterwards, the FE-1 worked on the RS radiation payload suite "Matryoshka-R", activating the Bubble-dosimeter reader and gathering the detectors, deployed on 9/24 in the RS, for reading and recording their accumulated data. The log sheet was then to be downlinked to TsUP via BSR-TM payload data channel. *[Six of the new Bubble dosimeter detectors had been positioned at their exposure locations, near the "Phantom" unit on the DC1 panel and in the starboard crew cabin on both sides of the MOSFET (metal oxide semiconductor field-effect transistor) dosimeter detector unit. The complex Matryoshka payload suite is designed for sophisticated radiation studies. Note: Matryoshka is the name for the traditional Russian set of nested dolls.]*

Clay Anderson completed his fourth run with the MedOps WinSCAT (Spaceflight Cognitive Assessment Tool) experiment by logging in on the MEC (Medical Equipment Computer) and performing the psychological evaluation exercise on the laptop-based WinSCAT experiment. *[WinSCAT is a time-constrained questionnaire test of cognitive abilities, routinely performed by astronauts aboard the ISS every 30 days before or after the PHS (periodic health status) test or on special CDR's, crewmembers or flight surgeons request.]*

The FE-2 performed the daily assist of the ongoing SAME (Smoke Aerosol Measurement Experiment) investigation, powering up the MSG (Microgravity Science Glovebox) facility and MLC (MSG Laptop Computer) and changing out the

SAME sample carousel, thermal precipitator, digital video tape, and alcohol wick. *[Carousel #4 was replaced by #5, to be run on Thursday & Friday this week. This will end the SAME experiment. The hardware will be disassembled and removed during the docked period, and all items except for the alcohol wick will be returned to Earth on 10A.]*

Continuing his support of the MELFI (Minus-Eighty Laboratory Freezer for ISS) facility, Anderson inserted two -32 degC Icepacs in the freezer, one belt in Dewar 2/Tray C (Section 4), a second into Dewar 2/Tray D (Section 4). *[Icepacs are used as thermal mass to keep samples cold during return and during extended MELFI power downs, e.g. during the recent Soyuz relocation. During this period, MELFI was off for ~15 hrs, reaching a max temperature of -17.8 degC (-64.3 F),- no problems. No more than 2 ambient Icepacs may be inserted at any given time into a Dewar that has samples in it, to protect the latter from warming up.]*

The FE-2 undertook the monthly (Week 24) potable water sampling for inflight and post-flight chemical analysis, using jointly approved Russian sampling procedures with the U.S. WS&A (Water Sampler & Archiver) kit for collection. Today's sampling activity was more extended than in the past. *[Six samples were taken in the SM at the potable water SRV-K hot port and SRV-K warm port and two from CWCs (Contingency Water Containers) for the SVO-ZV water supply system. Five of the six port samples will return on 10A; the sixth sample and the two CWC specimens are being processed on board with the MCDs (Microbial Capture Devices) and incubated for two days. The sixth port sample is also being processed for coliform detection.]*

FE-1 Kotov conducted the routine maintenance of the SOZh (ECLSS/Environment Control & Life Support System) system in the SM, including ASU toilet facilities systems/replaceables.

Oleg also updated/edited the standard daily IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The two cosmonauts began with personal preparations for their departure on Soyuz 14S on 10/21, going by an uplinked "End of Expedition 15 Cleanup" list. *[Items packed for return on Soyuz are to be reported in the IMS. Other contents of their personal bags, such as clothing, can be trashed in a KBO-M container. Some equipment, e.g., generic US clothing, can be restowed (in PMA-1).]*

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR/full duration, FE-1/full duration, FE-2) and

RED resistive exerciser (FE-2).

Later today, Clay will transfer the crewmembers' exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

As a second discretionary job, Kotov performed the regular status check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

As additional "get-ahead" activities, Fyodor's and Oleg's task reiterates four long-term tasks, viz., (1) a running an inventory behind panels in the RS when other activities are being performed, (2) photo/video imagery of "Life on the Station" scenes in the RS (e.g., sleep & post-sleep, behavior of water in zero-G, food preparation, RS interior architecture, cosmonauts at work controlling the station, housekeeping, clothing, medical exams, viewing videos for entertainment, (3) auditing/inventorying the current computer network supplies, and (4) conducting an audit of plug-in locations.

Other discretionary tasks on this week's "job jar" for Clay or the other crewmembers in their free time include unpacking 26P-delivered U.S. items, replacing an ER4 (EXPRESS Rack 4) light bulb, checking out SAFER (Simplified Aid for EVA Rescue Onboard Training) units, removing remaining MELFI MOOCE (On-Orbit Commissioning Experiment) gear, and prepacking 10A return cargo.

*FGB SAW Update:* Both solar array wings of the FGB "Zarya" module are in nominal configuration, i.e., properly folded in accordion-wise. *[Without additional heat rejection capability, the US segment (USOS) cannot support the ESA/"Columbus" and JAXA/"Kibo" modules, when attached. To provide this capability, the ISS starboard PVR will be deployed during Shuttle mission STS-120/10A, followed by the port PVR shortly after 10A. These activities require that the FGB SAWs must be completely retracted to avoid physical contact. With its SAWs no longer producing electricity, the FGB depends solely upon USOS power feeds (PMA-1 & PMA-2). In the event of some USOS electrical failures, a*

*contingency electrical jumper would be available to quickly reconnect USOS power to the FGB's ARCU (American-to-Russian Converter Unit), or its backup, for converting from American 124V to Russian 28V. Currently, the six FGB batteries are fully charged.]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

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Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0002556

Solar Beta Angle -- 48.3 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.75

Mean altitude loss in the last 24 hours -- 53 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50755

Significant Events Ahead (*all dates Eastern and subject to change*):

10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**

10/08/07 -- U.S. Holiday (Columbus Day)

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~11:00am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

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11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

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04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/30/07  
**Date:** Sunday, September 30, 2007 2:59:10 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/30/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for the crew except for daily housekeeping and voluntary work. Ahead: Week 24 of Increment 15.*

CDR Fyodor Yurchikhin conducted the routine maintenance of the SOZh (ECLSS/ Environment Control & Life Support System) system in the Service Module (SM), including ASU toilet facilities systems/replaceables plus the weekly collection of toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Fyodor also gathered weekly data on total operating time and activity durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's Air Revitalization Subsystem (SOGS) for reporting to TsUP.

The crewmembers worked out according to their regular daily 2.5-hr physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR/full duration, FE-1/full duration) and RED resistive exerciser (FE-2).

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second task on Oleg's voluntary work list was another run of the Russian "Diatomeya" ocean observations program. Using the NIKON-F5 (85 mm lens) still camera and the Sony DSR PD-150P camcorder from SM window #7, Kotov worked on obtaining imagery of color bloom and cloud pattern anomalies. *[Note: Today,*

*the ISS flight path extended along sub-arctic oceanic water and the largest bottom upwelling (including atolls), also above extra-tropical atmospheric jet stream areas above ocean, the most likely location for plankton color blooms, turbulent water, divergent areas in fields of turbulence and cloud cover pattern typical for spring time in Southern hemisphere. Photo targets in the Atlantic and Indian Oceans were along the path Brazilian offshore area – underwater mid-oceanic range in Atlantic Ocean – coastal waters of Kerguelen Island, and in the Pacific Ocean along the track Tuamotu Island – coastal area of Argentina.]*

As a third discretionary job, Kotov serviced the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, rebooting the computer and changing the operating mode of the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse.

Another voluntary task for Oleg was the periodic collection of the accumulated data of the "Matryoshka-R" MOSFET (metal oxide semiconductor field-effect transistor) dosimeters. *[The complex Matryoshka payload suite is designed for sophisticated radiation studies. The payload collects radiation measurements every 15 minutes of each hour around the clock.]*

CDR Yurchikhin's discretionary task list for today called for another session of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature.

*[Photo targets were the Patagonian ice field, and icebergs in the Waddell Sea.]*

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/29/07  
**Date:** Saturday, September 29, 2007 1:14:57 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/29/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- off-duty day for CDR Yurchikhin, FE-1 Kotov and FE-2 Anderson except for housekeeping and voluntary work.*

FE-2 Clay Anderson continued the NASA-JSC experiment SLEEP-LONG (Sleep-Wake Actigraphy & Light Exposure During Spaceflight) which calls for daily post-sleep monitoring of his sleep/wake patterns and light exposure with an Actiwatch. *[To monitor the crewmember's sleep/wake patterns and light exposure, the special Actiwatch device measure the light levels encountered by him as well as his patterns of sleep and activity.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, the CDR and FE-1 performed preventive maintenance cleaning on the V3 fan screen in the DC1 (Docking Compartment) and on the VPkhO, VdPrK, VPrK and TsV2 fan grilles in the FGB.

At ~5:45am EDT, the two Russian cosmonauts tagged up with ground specialists via S-band to discuss details of their physical reconditioning preparatory to their return to Earth next month (10/21).

Later, Yurchikhin and Kotov maneuvered the Canadian SSRMS (Space Station Remote Maneuvering System) robotarm to the position for video-surveying the

retraction of the FGB port solar array wing (SAW) at 8:59am-9:14am on DO13 over RGS (Russian Ground Site) for telemetry monitoring. *[The starboard SAW was successfully folded in yesterday. Without additional heat rejection capability, the US segment (USOS) cannot support the ESA/"Columbus" and JAXA/"Kibo" modules, when attached. To provide this capability, the ISS starboard PVR will be deployed during Shuttle mission STS-120/10A, followed by the port PVR shortly after 10A. These activities require that the FGB SAWs must be completely retracted to avoid physical contact. With its SAWs no longer producing electricity, the FGB depends solely upon USOS power feeds (PMA-1 & PMA-2). In the event of some USOS electrical failures, a contingency electrical jumper would be available to reconnect USOS power to the FGB's ARCU (American-to-Russian Converter Unit), or its backup, for converting from American 124V to Russian 28V. Currently, the six FGB batteries are fully charged.]*

After the port SAW retraction, FE-2 Anderson was to disconnect the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable at the Lab RWS (Robotics Work Station) which was required for video coverage of the retraction.

At ~9:00am EDT, the crewmembers held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Clay Anderson filled out the regular FFQ (Food Frequency Questionnaire), his 12<sup>th</sup>, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Fyodor Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Clay disassembled and stowed the hardware of the EPO (Educational Program Operation) "Kit C" payload for return on STS-120/10A. *[The removal needed to be completed before the upcoming OGS (Oxygen Generation System) activation. The demo/experiment dealt with the growth of basil and lettuce in zero-G, in support of an Engineering Design Challenge for K-12 students of all abilities. During its 20-day run, Clay took still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants were watered on all odd numbered days.]*

At ~12:25pm, Clay powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), to conduct, at 12:30pm, a ham radio exchange with students in a public event at the Smithsonian Air & Space Museum (NASM) in Washington, DC. *[The ARISS (Amateur Radio in ISS) contact was part of the NASM Family Day events commemorating 50 Years in Space, supported by the Charles Simonyi Fund for Arts and Sciences. Students selected from the audience asked the questions, which therefore could not be uplinked beforehand.]*

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A second (periodic) task from the voluntary work list for Oleg was the use of the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

Another job item on Kotov's discretionary list for today (in the morning) was the regular status check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

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*[Photo targets were the Andes and the Huascarán volcano in Peru, the ice field of Patagonia, and icebergs in the Waddell Sea.]*

### **Weekly Science Update (Expedition Fifteen -- 23<sup>rd</sup>)**

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* ALTEINO instrument continues to acquire nominally radiation levels in the SM. Next memory card exchange is currently scheduled on 10/4.

*ANITA*: ANITA continues to operate nominally and the PI team is busy analyzing the data and updating calibration files based on the results. “We will uplink revised files via ground commanding in the future. One early result we can share with you is that ANITA has detected trace amounts of a gas used for the calibration of the PFS as part of your PFE/OUM.”

*BCAT (Binary Colloidal Alloy Test)*: Reserve.

*CARDIOCOG-2*: Completed.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS)*: Continuing,

*CFE (Capillary Flow Experiment)*: Reserve.

*CHROMOSOME-2 (E14 SFP)*: Completed.

*CSI-2/CGBA (CGBA Science Insert #2/Commercial Generic Bioprocessing Apparatus)*: In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2)*: Complete.

*EarthKAM (Earth Knowledge Acquired by Middle School Students)*: Next scheduled operation is 10/29-11/3.

*EMCH (Elastic Memory Composite Hinge)*: Complete.

*EPO (Educational Payload Operation) Kit C*: Planned.

*IMMUNO (Saliva Sampling)*: First session samples are currently stowed in MELFI Dewar #2.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*: Complete.

*MISSE (Materials ISS Experiment)*: Ongoing.

*MTR-2 (Russian radiation measurements)*: Passive dosimeters measurements in DC1 “Pirs”.

*MULTIGEN-1*: Since last report on 9/20, the EMCS (European Modular Cultivation System) facility has fully recovered all its functionalities. On 9/21 the EMCS MMU (Mass Memory Unit) has been successfully reformatted. During the weekend,

environmental controls (humidity, temperature, illumination) have been maintained.

Only the 1-g stimulus of the B rotor could not be maintained. On 9/24, the application software has been re-installed with the help of the crew. Since then, EMCS is running nominally, and pictures are being downlinked on a regular basis.

Science team assessment is that plants continue to grow in B1 and A2 EC's (Experiment Containers). Plants have unfortunately wilted in the other EC's.

Additional germination may still be observed after additional watering. Science team is now concentrating on the circumnutation study of the plants' leaves and stems in B1 and A2. Sequences of images will be taken under 0-g and 1-g conditions over the next couple of days

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* "Thank you Clay for your work this week. We ran one Kapton sample today (9/28) and our preliminary findings are that the particles are growing larger. This is consistent with our hypothesis."

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION:* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*SAMPLE:* Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* n/a

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* "Clay, thanks for completing your last set of sleep logging. Your next activity will include a data download and initialization for the Increment 16 Commander's watch."

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 9/21 the ground has received a total of 15,023 CEO images for review and cataloging for Increment 15. 796 frames were received in the past week, however no CEO target requests have yet been

identified. On 9/12 the crew acquired a four-frame sequence mapping most of the Dinosaur National Monument located on the northern Colorado/Utah border. These oblique, long-lens views are mosaic. The combination of low sun angle and oblique view angle yield a striking perspective of the Monument's fossil-laden Yampa River valley and gorge. This mosaic product is being published on NASA/GSFC's Earth Observatory website this weekend.

Today's CEO (Crew Earth Observation) photo targets were **Pilcomayo River dynamics, Northern Argentina** (*this dynamic river issues from the Andes Mountains to the west and drains an area of more than 270,000 square kilometers. ISS passed over the headwaters region of the river in the Andean foothills. Overlapping nadir frames, acquired along-track, were requested to record the current channel width and riverbank morphology for comparison to historical imagery*), and **Mt. Ruapehu, New Zealand** (*Mt. Ruapehu had a small eruption on 9/25 which produced minor amounts of ash and ballistic ejecta near the summit. Two lahars [mudflows] also occurred as a result of the eruption. Looking to the right of track as the station passed over the North Island of New Zealand for the volcano; overlapping frames of the NE summit and flanks of the volcano were requested*).

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02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/28/07  
**Date:** Saturday, September 29, 2007 11:13:17 AM  
**Attachments:**

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/28/07  
**Date:** Friday, September 28, 2007 1:56:29 PM  
**Attachments:**

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/27/07  
**Date:** Thursday, September 27, 2007 5:19:05 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/27/07**

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**Soyuz TMA-10 (14S) relocation went smoothly.** After a brief ride in their crew return vehicle, CDR Fyodor Yurchikhin (left seat), FE-1 Oleg Kotov (center) and FE-2 Clayton Anderson (right) docked at the Service Module (SM) aft end port at 3:47pm EDT, completing the spacecraft's relocation from the FGB nadir port in just 27 minutes. *[After undocking at 3:20pm, Soyuz CDR Yurchikhin backed away from the station 25-30 m, then translated the spacecraft to the right, flying sideways, along the ISS toward the tail before turning nose-forward and rotating ("indexing") the Soyuz around its longitudinal axis to align its periscope with the docking target on the SM aft end, spending a short time in station-keeping mode. Final approach began at ~3:40pm, with docking at 3:47pm. After hooks and latches were engaged, the crew conducted leak checks and then reentered the station through the SM.]*

For the relocation, crew wakeup was slipped by three hours to 5:00am EDT. Sleep time begins early tomorrow morning ~2:00am (until 10:30am).

After wakeup, before breakfast, Clay Anderson accessed the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) experiment software for data logging, completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Clay wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition.]*

Preparing the US segment (USOS) for decrewing, FE-2 Anderson configured the ECLSS (Environment Control & Life Support System) and ITCS (Internal Thermal Control System), to be ready in the eventuality of a failed redocking of the crew. *[The ER1 (EXPRESS Rack 1) was powered off. After installation of jumpers (fluid*

*hoses) for the racks by Clay, the ground transitioned TCS to Dual-Loop Mode and raised the LTL (Low Temperature Loop) set point (i.e., to higher temperature), in order to provide redundancy in the USOS for critical avionics, for the unlikely event that a leak in one of the loops causes that loop to shut down, and to minimize the impacts of a depressurization. However, the time between ITCS reconfiguration, including IMV (Intermodular Ventilation) termination, and hatch closure had to be kept at a minimum by the crew to prevent humidity buildup in the USOS.]*

Anderson then configured the USOS OpsLAN (Operations Local Area Network) for uncrewed operation, including the two situation-monitoring Sony PD100 camcorders in the Lab and Node.

Afterwards, at ~7:50am, Clay closed the Lab, Node and Airlock (A/L) hatches, thus isolating the USOS from the Russian segment (RS). The Lab science window remains shuttered, due to the current SSRMS (Space Station Remote Manipulator System) position for observing FGB starboard array retraction.

After starting final preparations in the RS, FE-1 Kotov was joined by the CDR and FE-2 to complete systems reconfigurations for decrewing, including -

- Deactivation of
  - SOTR thermal control system,
  - Vozdukh CO<sub>2</sub> removal system (~7:40am)
  - ASU toilet system,
  - SKV air conditioner,
  - SRVK-2M water processing/supply system,
  - SOP food supply system,
  - PILLE radiation sensor system
  - FGB air ventilation fans
  - PSS Caution & Warning System in SM and FGB
  - PPS System Power Panel in the SM
  - DSD Pressure Alarm Sensor
  - Laptops & other plugged equipment,
  - TVIS treadmill, followed by
- Closing external shutters on SM windows (#6, 8, 12, 13, 14),
- Deactivation of DC1 Docking Compartment,
- Deactivation of SM ventilation system,
- Dismantling the VD1, VD2 air ducts and filters in the FGB,
- Powering down amateur/ham radio equipment in the FGB,
- Taking down air ducts between DC1 & SM,
- Closing GA-SU (PMA1) hatch in the FGB,

- Removing GA-PGO hatch frame ring in the FGB,
- Removing the RO-PrK hatch frame ring in the SM/DC1 vestibule,
- Powering down SM fans.

Hatches between DC1 & SM were closed at ~10:00am, between the FGB & Soyuz at ~11:00am. *[During the relocation, both PCS (Portable Computer System) laptops in the FGB and the PSS Caution & Warning (C&W) panels in all Russian modules were powered off prior to ingressing the Soyuz. Thus, there was a period of time without C&W audio annunciations in the RS and without an active PCS.]*

While locked out in TMA-10, the crewmembers donned their Sokol spacesuits, conducted Soyuz checkout operations and had their lunch break.

Next, Fyodor, Oleg and Clay conducted the standard fit check of the Kazbek couches, the contoured shock absorbing seats in the Soyuz Descent Module. *[For the fit check, crew members removed their cabin suits and donned Sokol KV-2 suit and comm caps, getting into in their seats and assessing the degree of comfort and uniform body support provided by the seat liner. Using a ruler, they then measured the gap between the top of the head and the top edge of the structure facing the head crown. The results were reported to TsUP. Kazbek-UM couches are designed to withstand g-loads during launch and orbital insertion as well as during reentry and brake-rocket-assisted landing. Each seat has two positions: cocked (armed) and noncocked. In cocked position, they are raised to allow the shock absorbers to function during touchdown. The fit check assures that the crewmembers, whose bodies gain in length during longer-term stay in zero-G, will still be adequately protected by the seat liners for their touchdown in Kazakhstan, either emergency or regular return.]*

RS thrusters were disabled at ~12:45pm for the QD (quick disconnect) screw clamps removal and hook opening. *[Thrusters re-enabled at 1:10pm.]*

After Soyuz docking, leak checking and Sokol drying, the thrusters will again be disabled at ~5:00pm for the post-docking clamp installation, following Soyuz/SM hatch opening at ~6:15pm. At ~6:55pm, RS thrusters will be re-enabled.

For the relocation, ISS attitude control authority was handed over to RS motion control at 2:10pm. After relocation, control returns to US momentum management at ~4:40pm.

TMA-10 deactivation begins at about 8:40pm. Hatch opening to the USOS (Node, Lab, Airlock) is expected to start at ~8:55pm and ISL (Integrated Station OpsLAN) restoration should be accomplished by ~9:55pm.

After reconfiguring station comm to nominal mode, the crew will reactivate all station systems that had been switched to autonomous (unmanned) configuration. *[Backout (reverse order) activation, generally requiring the crew only for monitoring, involves the PPS power system, PSS C&W panels in SM, FGB and DC1, DSD pressure alarm sensor, Central Post BVS computer/control systems (Wiener laptop, printer, InPU displays), ventilation systems and air ducts in SM, DC1 and FGB, SM ASU toilet facilities, time clock, Vozdukh CO2 scrubber, SKV air conditioner, SRVK-2M condensate water supply system & processor, SOTR thermal control system, SOP food systems, STTS onboard communications links, Pille radiation dosimeters, TVIS treadmill, etc.]*

As part of RS post-docking activities, the crew will also complete the drying out of their Sokol suits and gloves.

Before turning in tomorrow morning at ~2:00am, FE-1 Kotov has two tasks on his discretionary "time permitting" job list: (1) the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator; and (2) the regular status check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload.

Due to the crowded timeline, requiring meticulous attention to detail, medical personnel had waived today's physical exercise sessions for the crew.

CEO (Crew Earth Observation) photo targets uplinked for today were **S. Georgia/S. Sandwich, S. Atlantic Ocean** (*S. Georgia/S. Sandwich, S. Atlantic Ocean (a large gap in cloud cover has opened to the SE of South America, providing an opportunity to photograph South Georgia Island. Looking to the right of track for this large, typically snow-covered island. Detailed photography of ice extent on the island is of particular interest; overlapping frames that cover the island were requested)*), **Mt. Ruapehu, New Zealand** (*ISS had a partly cloudy pass close to Mount Ruapehu, one of New Zealand's most active volcanoes - its last eruption was in 2006. Orbit track followed the Great Barrier Reef southeast; after the pass over the Reef, the crew was to look to the left of track for the North Island of New Zealand and Mt. Ruapehu. Detailed imagery of the peak and mountain flanks was requested*), and **Lake Eyre, Australia** (*the largest lake in Australia, Lake Eyre is of interest as an indicator of climate change, as water levels in the lake fluctuate in response to precipitation patterns and evaporation. Orbit pass took the ISS over the northeastern portion of the lake. Overlapping mapping frames around the perimeter of the lake were requested to record current water levels*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:46am EDT [= epoch]*):

Mean altitude -- 343.9 km

Apogee height -- 345.7 km

Perigee height -- 342.2 km

Period -- 91.41 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0002602

Solar Beta Angle -- 45.8 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.75

Mean altitude loss in the last 24 hours -- 40 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50692

**Significant Events Ahead** (*all dates Eastern and subject to change*):

09/28/07 – FGB starboard solar array retraction 1 (10:09–10:26am)

09/29/07 – FGB port solar array retraction 2 (8:59–9:14am)

10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~11:00am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 “Harmony”, racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis/1E undocking

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 “Jules Verne” launch/Ariane V (Kourou, French Guyana)

01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)

02/06/08 – Progress M-62/27P undocking

02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/26/07  
**Date:** Wednesday, September 26, 2007 2:47:09 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/26/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, FE-2 Clayton Anderson accessed the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) experiment software for data logging, completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Clay wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition.]*

In preparation for tomorrow's Soyuz relocation (and the unlikely possibility of an Earth return), the three crewmembers performed fit-checks and adjustments on the Russian Kentavr ("Centaur") garments for their individual sizes. The suits are kept in the Habitation Module of the Soyuz TMA until undock day. The activity was supported by a tagup with ground specialists via S-band, as required. *[The Russian Kentavr garment is a protective anti-g suit ensemble to facilitate the return of a long-duration crewmember into the Earth gravity. Sizing consists of adjusting lacing on the outer side of the shorts and on the inner side of the gaiters to achieve a tight fit.]*

As required for the uncrewed relocation period, FE-1 Oleg Kotov powered down the Elektron-VM oxygen (O<sub>2</sub>) generator, safety-purging its BZh Liquid Unit with nitrogen (N<sub>2</sub>) at 0.65 kg/cm<sup>2</sup> via its KE3 and VN3 valves.

The FE-1 also collected water samples downstream of the Elektron's BKO multifiltration/purification column unit, to be returned to the ground on Soyuz 14S for monitoring the quality of the water being fed to the Elektron near the end of a BKO's service life.

Afterwards, Kotov removed the BKO unit, replaced it with a new spare from stowage and discarded the old unit.

CDR Yurchikhin set up Laptop 3 and the Russian “Relaksatsiya” (Relaxation) spectrometer & video camera at the SM PkhO (Service Module Transfer Compartment)’s window 12, followed by a session of the Plasma-ISS (Bridge-1) experiment, his second of the Increment. After configuring systems & modes, the CDR made calibrations, then conducted measurement operations at three time intervals. The hardware was later disassembled, closed out and stowed away. *[To support the activity, the U.S. PCU1 (Plasma Contactor Unit 1) on the Z1 truss was turned on by MCC-H at 3:00am EDT (and deactivated at ~8:00am). Then, using the laptop and the “Relaksatsiya” spectrometer & video camera, the experiment registered luminosity values of the Xenon jet from the PCU1 when reaching the 2A/4A SAWs (Solar Array Wings). ]*

In preparation for the spacecraft relocation, Oleg Kotov and Fyodor Yurchikhin completed final close-out activities on the Progress M-61/26P cargo ship, docked at the DC1 Docking Compartment, to enable its potential contingency separation by TsUP in the crew’s absence. *[First, Oleg activated necessary vehicle systems on 26P, then the two cosmonauts removed the threaded quick-disconnect (QD) screw clamps of the SSVP docking & internal transfer system in the hatchway between Progress and DC1, which rigidize the mating surfaces. The interface was visually inspected and videotaped to ensure that there is no damage to the cords, snap hooks or rings on the latches and to the slots for the clamps in the SSVP’s internal flanges. Finally, the crew closed hatches between Progress and DC1, followed by depressurization of the DC1-to-Progress vestibule for the mandatory one-hour leak checking. RS (Russian segment) thrusters, which were inhibited at ~8:40am EDT, i. e., prior to the QD clamps removal, were then re-enabled (~10:20am). After the relocation, all the aforementioned steps will be reversed, to restore accessibility and connectivity of the Progress, which is to remain docked for another twelve weeks.]*

Further preparations by FE-1 Anderson for the uncrewed period were –

- Setting up two Sony PD100 camcorders in the Lab and Node for situational awareness during the unoccupied time;
- Transferring US hardware (CDs, SODF/Procedures Books) from the US segment (USOS) to the RS, and
- Relocating a PCS (Portable Computer System) laptop to the RS, i.e., the Cupola RWS A31p to the FGB, set up as backup PCS).

Clay also had another 1.5 hrs reserved for prepacking/staging cargo for return on 10A.

Fyodor conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Oleg updated/edited the standard daily IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Kotov performed the periodic data collection and downlink on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse.

The crewmembers worked out according to their regular daily physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1/full duration), and RED resistive exerciser (CDR, FE-2).

Later today, FE-2 Anderson transfers the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

At ~11:30am EDT, Yurchikhin, Kotov and Anderson joined in downlinking four Russian TV messages of greetings dedicated to the 50<sup>th</sup> Anniversary of the first artificial Earth satellite launch, Sputnik 1. The addresses were directed to (1) a science forum in St. Petersburg dedicated to the 50<sup>th</sup> Anniversary of the Space Era (*"...The launch of the first Earth satellite on October 4, 1957, signaled the beginning of the space era in the history of mankind, opened the gate for exploration of near and deep space for study of solar and other constellations, and served as the first step for permanent human presence in space... We are sending our space greetings to the residents of the city on the Neva River where national rocket industry was born, where in the past century's twenties the famous Gas Dynamics Laboratory was actively involved in its work..."*); (2) personnel and veterans of the Space Forces, (3) participants of the opening ceremony of the First Satellite monument in Korolev (*"...the first steps in space were made in Kaliningrad near*

*Moscow by our remarkable compatriots under the leadership of Sergey Pavlovich Korolev, whose name your wonderful city is bearing...”), and (4) Ulyanovsk State Engineering University (“...your university, just like the launch of the first Earth satellite, is turning 50. That’s why, despite the distance, we couldn’t miss your anniversary... Learn and venture! The Universe is in front of you. Roskosmos plans to send a cosmonaut to the Moon by 2025 and to Mars by 2030. Your participation will be needed for training and implementation of these expeditions...”).*

At ~12:45pm, Clay powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), to conduct, at 12:50pm a ham radio exchange with students at Art & Pat Goforth Elementary School in League City, Texas. Questions to the crew were uplinked by ARISS Amateur Radio on ISS) beforehand. Clay Anderson is the parent of one of Goforth Elementary’s first grade students, and his daughter asked the first question during the contact. [*“What’s it like to live in space?”; “How does it feel when you are lifting off?”; “Why can’t you bring regular food that we eat on Earth into space?”; “Do you enjoy doing flips in zero gravity?”; “How does earth and all the other planets look from the space station?”*]

With the BITS2-12 onboard telemetry measurement system and VD-SU control mode turned off, TsUP/Moscow conducted testing on the primary LKTs2B36 unit in the BITS LKTs (local digital commutator/switch) container. [*On 7/13, Oleg and Fyodor had installed a new TA250 temperature sensor on the LKTs2B36.*]

#### *Soyuz 14S Relocation Timeline Preview (9/27, EDT):*

- 09:25am: Soyuz 14S activation (until 09:40am)
- 11:20am: Hatch closure and leak check (until 12:20pm)
- 02:10pm: USOS to RS MCS (Motion Control System) handover
- 03:17pm: Undocking command sent manually
- 03:14pm: ISS in free drift (until 03:23pm)
- **03:20pm**: Physical separation (sep spring delta-V ~0.12 m/s)
- 03:26pm: Commence fly-around to SM aft end (until 3:36pm, range ~30m)
- 03:41pm: Orbital sunset
- 03:42pm: Commence final approach (with headlight)
- **03:45pm**: Docking to SM aft end port (on DO1)
- 04:13pm: Orbital sunrise
- 04:40pm: RS to USOS MS handover
- 05:00pm: Start leak check (until ~6:15pm)
- 06:15pm: Soyuz/SM hatch opening.

*Soyuz 14S Relocation Crew Activities Preview:* There will be a sleep cycle shift for

the ISS crew tomorrow, with wake-up delayed by about three hours to 5:00am (sleep 2:00am). ISS systems will be configured by crew & ground for unmanned ops for the unoccupied period during relocation. After the relocation and post-ingress, all systems will be reconfigured to nominal ops in reverse order. *[This includes deactivation of SOTR thermal control system, Vozdukh CO<sub>2</sub> removal system, ASU toilet system, SKV air conditioner, SRVK-2M water processing/supply system, SOP food supply system, PILLE radiation sensor system, FGB air ventilation fans, PSS Caution & Warning System in SM and FGB, PPS System Power Panel in the SM, DSD Pressure Alarm Sensor, laptops & other plugged equipment, plus disconnecting OpsLAN cables running through hatches, and shutting off the TVIS treadmill. After closing external shutters on the Lab science window and SM windows (#6, 8, 12, 13, 14), the crew also deactivates the DC1 Docking Compartment, SM ventilation system, dismantles air ducts, disconnects the VD1 & VD2 air duct filters in the FGB, removes the GA-PGO hatch frame ring in the FGB and the RO-PrK hatch frame ring in the SM/DC1 vestibule, and powers down SM fans.]*

Today's CEO (Crew Earth Observation) photo targets were **Antarctic Ice Pack, S. Indian Ocean** (*weather patterns continue to provide patchy cloud cover over the southern Indian Ocean. Looking to the right of track as ISS approached Antarctica for opportunities to photograph icebergs and smaller ice fragments on the sea surface*), and **Tropical Storm Karen, Atlantic Ocean** (*Dynamic Event. Looking to the left of track for this storm system as the station passed over the eastern Caribbean and approached Brazil. Sunrise should have illuminated the cloud tops, and shadowing may have caused sharp relief on cloud banding features*).

CEO photography can be viewed and studied at the websites:  
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<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:22am EDT [= epoch]*):

Mean altitude -- 343.9 km

Apogee height -- 345.8 km

Perigee height -- 342.1 km

Period -- 91.41 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0002814

Solar Beta Angle -- 43.5 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.75

Mean altitude loss in the last 24 hours -- 70 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 50676

**Significant Events Ahead** *(all dates Eastern and subject to change):*

09/27/07 -- Soyuz TMA-10/14S relocate to SM aft port (~3:20-3:45pm)  
09/28/07 -- FGB solar array retraction 1 (10:09–10:26am)  
09/29/07 -- FGB solar array retraction 2 (8:59–9:14am)  
10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~11:00am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 “Harmony”, racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 “Jules Verne” launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking

05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/25/07  
**Date:** Tuesday, September 25, 2007 1:36:19 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/25/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, FE-2 Clayton Anderson accessed the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software for data logging, completing questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmember's sleep/wake patterns and light exposure, Clay wears a special Actiwatch device which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition.]*

In preparation for the FGB solar array (SA) retraction on 9/28 (Friday), Anderson connected the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable at the Lab RWS (Robotics Work Station) and later maneuvered the Canadian SSRMS (Space Station Remote Maneuvering System) robotarm to the position for video-surveying the SA retraction.

The FE-2 also closed the Lab science window shutter in support of the subsequent Soyuz 14S thruster test firing as protection against jet plume contaminants.

For the Soyuz TMA-10/14S relocation on 9/27 (Thursday), the three crewmembers conducted a review of flight procedures and completed the standard 3-hr. training drill for the mission, supported by ground specialists via tagup on S-band/VHF-audio. *[The OBT (on-board training) included Soyuz procedures and data analysis for ascent/descent, orbital flight and relocation as contained in RODF (Russian Operations Data File) books, tag-up with instructor, and OBT simulator work on the RSK1 laptop. For the relocation, the crew has to be prepared for a return to Earth in the event of a no-docking contingency, and the station has to be configured for uncrewed operation (see Preview, below).]*

Also in preparation for the spacecraft relocation, Flight Engineer Kotov spent an hour in the 14S Descent Module (SA) supporting a ground-commanded checkout of the Soyuz motion control system (SUD, Mode 2/"Docked") which included pressurization of the Combined Propulsion System (KDU) Section 1 and Tank 1, a test of the pilot's translational hand controller (RUD), and a hot firing of the DPO braking thrusters. KDU maneuver thrusters and DPO lateral thrusters were not fired. *[For the test, station attitude was handed over to Russian thruster control at 8:52am EDT, commanded to free drift at 8:57am, then back to LVLH XVV (Local Vertical Local Horizontal/x-axis in velocity vector) attitude. The one-minute firing started on Daily Orbit 12 at 9:05am. Attitude control was returned to the U.S. segment (USOS) at 9:45am.]*

As the Progress M-60/25P cargo ship is ending its independent six-day flight, CDR Yurchikhin will again support its scientific research activities today with the geophysical GFI-1 Relaksatsiya ("relaxation") experiment, conducting spectroscopic video observation of the engine exhaust plume during and after the spacecraft's 2.5-min. deorbit burn at 3:01pm EDT, executed with the main engine (SKD). Later, the GFI-1 hardware will be restowed. *[After unpacking and setting up the equipment from six GFI-1 hardware kits, reconfiguring the payload Laptop 3 for the experiment and mounting the UV (ultraviolet) camcorder with its SP spectrometer unit at SM (Service Module) window #9, Yurchikhin initially records spectral imagery of radiation from the Earth surface and atmosphere, then again before, during and after the Progress engine firing at 3:01pm. Purpose of the experiment is to contribute to a space/time study of UV (ultraviolet) radiation patterns from the Earth and from engine burns at high altitude. Relaksatsiya normally deals with the study of the chemoluminescent chemical reactions and atmospheric light phenomena (emissions, i.e., molecular relaxation processes), including those that occur during high-velocity interaction between the exhaust products from space vehicles and the atmosphere at orbital altitude and during the entry of space vehicles into the Earth's upper atmosphere.]*

Using the vacuum cleaner and other tools, FE-2 Anderson performed the periodic one-hour US segment (USOS) hatch seal inspection (Node forward, aft & starboard, Lab aft, Airlock hatch) in support of ACS (Atmospheric Control System) maintenance (last time done: 7/11).

Anderson also completed the periodic (monthly) CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout on the new prime unit (#1057) and backup unit (#1060). *[The CSA-CP is a passive cabin atmosphere monitor that provides quick response capability during a combustion event (fire). Its collected data are stored on a logger. Clay changed out the batteries on both units, then zero-calibrated both instruments (to eliminate drift in the combustion sensors). Following zero calibration, the backup unit was stowed in the Node (next to the*

*sampling pump), while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

Before sleep time tonight, Clay will disconnect ER1 (Express Rack 1) from the Lab ITCS (Internal Thermal Control System) at its RIP (Rack Interface Panel). *[When deactivated (by ground commanding), the rack is preferably disconnected from ITCS to prevent increased quantity decay in the coolant accumulator.]*

CDR Yurchikhin removed outdated pages in the Contingency Jumper Procedures SODF (Station Operations Data File) book and replaced them with printouts of a new procedures version.

Oleg Kotov completed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water collected in CWC (Contingency Water Container) #1068 from the Lab CCAA (Common Cabin Air Assembly) dehumidifier. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

On the CEVIS (Cycle Ergometer with Vibration Isolation), Clay Anderson performed the regular monthly maintenance, which deals mostly with an examination of the wire rope isolators for damage.

The FE-2 also conducted the periodic (every two weeks) inspection of the RED (Resistive Exercise Device) canister cords and accessory straps as well as the canister bolts for re-tightening if required.

The crewmembers worked out according to their regular daily physical exercise program (about half of which is used for setup & post-exercise personal hygiene); on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1/both full duration), and RED resistive exerciser (FE-2).

Later today, FE-2 Anderson will transfer the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Oleg conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The FE-1 also updated/edited the standard daily IMS "delta file", including locations,

for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Working from the Russian discretionary “time permitting” task list, Kotov completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second task from the voluntary work list for Oleg (in the morning) was the regular status check on the long-term BIO-5 Rasteniya-1 (“Plants-1”) micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

At ~3:15pm, Clay is scheduled for a crew-choice teleconference with colleagues via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

*Saturday Science Preview:* Three optional activities for the voluntary “Saturday Science” program for next weekend (9/29-30) were suggested to Clay for his choice. His selection is required by tonight. *[The three choices are: (1) CFE VG1 (Capillary Flow Experiment – Vane Gap 1): voice & video of another run of to complete the CFE-VG1 experiment; (2) SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites), flying two & three satellites, requiring CDRA (CO<sub>2</sub> Removal Assembly) to be running; and (3) BCAT-3 (Binary Colloidal Alloy Test-3) Magnet Unstick, using the CGBA-4 (Commercial Generic Bioprocessing Apparatus-4), powered up 12 hrs before.]*

*Reboost Update:* The ISS reboost yesterday by the twin SM main engines was successfully conducted on time (3:34pm EDT). Purpose of the ~2.5 minute long maneuver burn was to establish the correct phasing conditions for 15S launch, 14S landing, and the STS-120/10A launch season (FD3 rendezvous). The reboost produced a delta-velocity (delta-V) of 3.1 m/s (predicted: 2.9 m/s). Mean altitude increase (delta-H): 5.3 km (2.86 nmi).

*Soyuz 14S Relocation Timeline Preview (9/27, EDT):*

- 09:25am: Soyuz 14S activation (until 09:40am)
- 11:20am: Hatch closure and leak check (until 12:20pm)
- 03:16pm: Undocking command sent manually

- 03:14pm: ISS in free drift (until 03:23pm)
- **03:19pm**: Physical separation (sep spring delta-V ~0.12 m/s)
- 03:25pm: Commence fly-around to SM aft end (range ~30m)
- 03:41pm: Orbital sunset & commence final approach (with headlight)
- **03:44pm**: Docking to SM aft end port (on DO1)
- 04:13pm: Orbital sunrise.

*Soyuz 14S Relocation Crew Activities Preview:* There will be a sleep cycle shift for the ISS crew on 9/27, with wake-up delayed by about three hours to 5:00am (sleep 2:00am next morning). Since ISS remains unoccupied during relocation, it will be configured by crew & ground for unmanned ops. *[This includes deactivation of SOTR thermal control system, Vozdukh CO<sub>2</sub> removal system, ASU toilet system, SKV air conditioner, SRVK-2M water processing/supply system, SOP food supply system, PILLE radiation sensor system, FGB air ventilation fans, PSS Caution & Warning System in SM and FGB, PPS System Power Panel in the SM, DSD Pressure Alarm Sensor, laptops & other plugged equipment, plus disconnecting OpsLAN cables running through hatches, and shutting off the TVIS treadmill. After closing external shutters on the Lab science window and SM windows (#6, 8, 12, 13, 14), the crew also deactivates the DC1 Docking Compartment, SM ventilation system, dismantles air ducts, disconnects the VD1 & VD2 air duct filters in the FGB, removes the GA-PGO hatch frame ring in the FGB and the RO-PrK hatch frame ring in the SM/DC1 vestibule, and powers down SM fans. After the relocation and post-ingress, all systems will be reconfigured to nominal ops in reverse order.]*

*Progress 25P Overview:* After undocking on 9/18, 25P remained in orbit for six days to conduct science experiments of ground viewing/studying plasma particles in the exhaust from a series of thruster firings (one per day) at various stages of flight: Timeline (today, 9/25, EDT):

- 3:01:00pm: Progress Deorbit burn start (SKD main engine, 170s, dV~85.3 m/s)
- 3:03:27pm: Deorbit burn complete
- 3:36:42pm: Entry Interface

Today's CEO (Crew Earth Observation) photo targets were **Kerguelen, S. Indian Ocean** (*looking to the right of track for the island of Kerguelen, located approximately midway between Africa, Australia, and Antarctica. Weather conditions were predicted to be partly cloudy, but the island should be clearly visible. General imagery of the entire island is requested to provide context for more detailed images of the summit glacier of the island*), **Antarctic Ice Pack** (*looking to the right of track as ISS approached Antarctica for opportunities to photograph ice fragments through the cloud cover. The crew had two overflight*

*opportunities), and **Palmerston Island reef, central S Pacific** (weather was predicted to be clear over Palmerston Island at the time of the station overflight. Detailed photography of the island and reefs located in the central lagoon is useful for tracking changes to reef configuration and color - both factors that may indicate changes in the status of the reef ecosystem. Overlapping nadir frames along-track were requested).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:58am EDT [= epoch]*):

Mean altitude -- 344.0 km

Apogee height -- 345.7 km

Perigee height -- 342.4 km

Period -- 91.42 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0010184

Solar Beta Angle -- 40.7 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.75

Mean altitude gain in the last 24 hours -- 5300 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50660

**Significant Events Ahead** (*all dates Eastern and subject to change*):

09/25/07 -- Soyuz 14S thruster test (9:05am)

09/25/07 -- Progress M-60/25P deorbit burn & entry over Pacific -- ~3:01pm

09/27/07 -- Soyuz TMA-10/14S relocate to SM aft port (~3:20-4:00pm) – FRR: 9/24

09/28/07 -- FGB solar arrays retraction

10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~11:00am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/24/07  
**Date:** Monday, September 24, 2007 1:27:47 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/24/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 23 of Increment 15.*

Before breakfast, FE-2 Clayton Anderson accessed the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completed questionnaire entries in the experiment's laptop session file on the HRF-1 laptop for later downlink. *[To monitor the crewmembers' sleep/wake patterns and light exposure, the special Actiwatch device measure the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition.]*

CDR Fyodor Yurchikhin and FE-1 Oleg Kotov continued the current round of periodic preventive maintenance of ventilation systems in the RS (Russian Segment). *[Yurchikhin started out in the FGB, replacing the PS1,2 dust filters and cleaning the TsV1 fan screen, while Kotov worked in the DC1 (Docking Compartment) to replace the PF1,2 filter cartridges and clean the V1 & V2 fan grilles and VD1 & VD2 air ducts. Later, Oleg moved to the SM (Service Module) for changing out the PF1-4 dust collector filters and cleaning Group A fan grilles, as Fyodor finished up in the FGB by cleaning the ventilation screens of panels 201, 301 & 401.]*

Anderson completed the daily assist of the ongoing SAME (Smoke Aerosol Measurement Experiment) investigation, powering up the MSG (Microgravity Science Glovebox) facility and MLC (MSG Laptop Computer) and changing out the digital video tape. *[POIC (Payload Operation & Integration Center) was to be informed of the new videotape's barcode ID. All items except for the alcohol wick will be returned to Earth on 10A.]*

Yurchikhin undertook a checkout of an IDZ-2 smoke detector (#A6) of the FGB's fire detection & suppression system (SPOPT), using the "Elektronika" MultiMeter for resistance measurements between connector pins.

Also in the FGB, the two Russian crewmembers performed troubleshooting on a temperature sensor of the SIT28 Temperature Measurement System, checking out resistances/continuity of the T97 sensor which has been giving false telemetry readings.

To access the Lab IMV (Intermodular Ventilation) to the Node and also prepare room for 10A, Anderson cleared and relocated stowage from the forward Lab port.

Afterwards, Clay completed the installation of an IMV valve of the THC (Temperature & Humidity Control) system in the Lab Forward Port Endcone (LAB1PO). *[The 1-hr. activity included installing a missing hose clamp, tightening an RMO (Remote Manual Operator) fastener, and installing RMO identification labels. This activity had been deferred from the originally scheduled date (9/19).]*

In the Node, the FE-2 inspected fastening screws on the port forward IMV valve installation.

Anderson also had a time slot of 2h 25m reserved for additional hardware staging/prepacking for return on Shuttle flight 10A.

Oleg Kotov set up new Bubble dosimeters for recording radiation traces as an additional component of the RS radiation payload suite "Matryoshka-R". *[Of new Bubble dosimeter detectors supplied, six were initialized in the Bubble dosimeter reader and positioned at their exposure locations, near the "Phantom" unit on the DC1 panel and in the starboard crew cabin on both sides of the MOSFET (metal oxide semiconductor field-effect transistor) dosimeter detector unit. The activity was supported by ground specialist tagup. The setup was photo-documented. The complex Matryoshka payload suite is designed for sophisticated radiation studies. Note: Matryoshka is the name for the traditional Russian set of nested dolls.]*

In preparation for the Soyuz TMA-10/14S relocation next Thursday (9/27), Fyodor and Oleg installed the StM Docking Mechanism between Progress M-61/26P and the DC1. *[The StM is the "classic" probe-and-cone type, consisting of an active docking assembly (ASA) with a probe (SSh), which fits into the cone (SK) on the passive docking assembly (PSA) for initial soft dock and subsequent retraction to hard dock. The ASA is mounted on the Progress' cargo module (GrO), while the PSA sits on the docking ports of the SM, FGB and DC1. 26P is being prepared for potential remote-commanded undocking in case of a docking contingency during the relocation of 14S, carrying the three crewmembers, from the FGB nadir port to the SM aft port.]*

Clay and Oleg performed the CHeCS CMO (Crew Health Care Systems/Crew

Medical Officer) on-board training drill, a 30-min. video & audio refresher course to hone the CMO's acuity in emergency medical operations. *[The proficiency drill focuses on re-familiarization with skills and techniques required in procedures related to medical issues arising on board and concludes with a self-assessment questionnaire. The HMS (Health Maintenance Systems) hardware, which includes ACLS (Advanced Cardio Life Support) equipment, may be used in contingency situations where crew life is at risk. To maintain proficiency, crewmembers spend one hour per month reviewing HMS and ACLS equipment and procedures via the HMS CBT (computer-based training) and the ACLS CBT.]*

In the Lab, the FE-2 performed troubleshooting on the UOP-3 (Utility Outlet Panel 3) in a continuing effort (started on 9/14) to isolate the component that caused the RPC-3 (Remote Power Controller #3) overcurrent trip in RPCM (RPC Module) LA2A3B late on 9/11. *[The troubleshooting procedure focused on the UOP, its PS-120 Junction Box, the Ku-Band Power Supplies and their associated cabling.]*

CDR Yurchikhin performed the periodic inspection of the RED (Resistive Exercise Device) bottom plate fasteners.

In addition, Fyodor conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including ASU toilet facilities systems/replaceables.

The CDR also updated/edited the standard daily IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

For the station reboost tonight (see below), Anderson is scheduled to close the Lab window cover to protect against thruster plume deposits.

At ~3:55am EDT, Clay powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), to conduct, at 4:00am a ham radio exchange with students at Heidelberg University for Applied Sciences, in Heidelberg, Germany. Questions to the crew were uplinked by ARISS Amateur Radio on ISS) beforehand. *[The students are currently involved in building a CubeSat satellite called HeidelSat, for measuring cosmic rays. Its launch is planned for September 2009. They are also building a ground station for it with a 3.4-m diameter satellite dish. "How does a compass work on the ISS?"; "Has the International Space Station already rammed space scrap metal?"; "Do watches work in space? Does one have a feeling of time in space?"; "What does your safe haven look like if your resources come to an end, the oxygen is scarce or a vital part of the ISS is destroyed and you cannot be reached from the earth?"]*

The crewmembers worked out according to their regular daily physical exercise program (about half of which is used for setup & post-exercise personal hygiene); on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2) and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later today, FE-2 Anderson will transfer the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

As additional "get-ahead" activities, Fyodor's and Oleg's "job jar" reiterated two long-term tasks, viz., (1) a running inventorying behind panels in the RS when other activities are being performed, (2) photo/video imagery of "Life on the Station" scenes in the RS (e.g., sleep & post-sleep, behavior of water in zero-G, food preparation, RS interior architecture, cosmonauts at work controlling the station, housekeeping, clothing, medical exams, viewing videos for entertainment).

*ISS Reboost:* Later today, at 3:34pm EDT, the ISS will be reboosted by the twin SM main engines (SM aft docking port currently being unoccupied) for the purpose of establishing the correct phasing conditions for 15S launch, 14S landing, and the STS-120/10A launch season (FD3 rendezvous). Expected delta-V of the burn: 2.9 m/s (9.5 ft/s); delta-H: 4.9 km (2.7 nmi).

*Soyuz 14S Relocation:* The ISS Mission Management Team (IMMT) today gave the formal Go-ahead on the 14S relocation on 9/27. There will be a sleep cycle shift for the ISS crew, with wake-up delayed by about three hours, similarly as for 13S relocation on 10/10/06.

*Progress 25P Timeline Overview:* After undocking on 9/18, 25P is remaining in orbit for six days to conduct science experiments of ground viewing/studying plasma particles in the exhaust from a series of thruster firings (one per day) at various stages of flight:

----- *Today, 9/24* –

4:26pm: Progress Burn #7 (DPO, 5s, dV~0.85 m/s, posigrade)

----- *Tuesday, 9/25* –

3:13pm: Progress Deorbit burn start (SKD, 170s, dV~85.3 m/s)

3:15:30pm: Deorbit burn complete

3:48:12pm: Entry Interface

[SKD = Main Engine; DPO = Approach & Attitude Control thrusters]

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:37am EDT [= epoch]*):

Mean altitude -- 338.9 km

Apogee height -- 345.8 km

Perigee height -- 331.9 km

Period -- 91.31 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0010184

Solar Beta Angle -- 37.4 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 75 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50644

**Significant Events Ahead** (*all dates Eastern and subject to change*):

09/24/07 -- ISS reboost (3:34pm,  $dV=2.9$  m/s; set-up f/Soyuz launch & 10A FD3 rendezvous)

09/25/07 -- Soyuz 14S thruster test (~9:00am)

09/25/07 -- Progress M-60/25P deorbit burn & entry over Pacific -- ~3:48pm

09/27/07 -- Soyuz TMA-10/14S relocate to SM aft port (~3:20-4:00pm) – FRR: 9/24

09/28/07 -- FGB solar arrays retraction

10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~11:00am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/23/07  
**Date:** Sunday, September 23, 2007 1:46:11 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/23/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for the crew except for housekeeping and voluntary work. Ahead: Week 23 of Increment 15.*

CDR Fyodor Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including ASU toilet facilities systems/replaceables plus the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Fyodor also gathered weekly data on total operating time & "On" durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

The crewmembers worked out according to their regular daily physical exercise program (about half of which is used for setup & post-exercise personal hygiene); on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2) and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later today, FE-2 Anderson will transfer the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second task from the voluntary work list for Oleg was another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Sony DSR PD-150P camcorder to obtain imagery of color bloom and cloud pattern anomalies from SM window #7. *[Photo targets in the Atlantic was the track from Cape Verde Islands water area over the Senegal river junction to the Cape of Good Hope, plus from the Florida coastal area over the Caribbean Sea to the Venezuelan coast, and in the Pacific Ocean along the track covering fishing-production regions in middle- and tropical-equatorial latitudes on both semi-spheres from California to Chile.]*

As a third discretionary job, Kotov performed the regular status check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

For CDR Yurchikhin, the discretionary task list for today called for another session of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature.

*[Photo targets were the Andes and the Huascarán volcano in Peru, the Patagonia ice field, and icebergs in the Waddell Sea.]*

At ~4:07pm EDT, Clkay Anderson will have his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop).

*ISS Reboost:* Tomorrow (Monday, 9/24) ISS will be reboosted by the twin SM main engines (SM aft docking port currently being unoccupied). Purpose of the reboost is to establish the correct phasing conditions for 15S launch, 14S landing, and the STS-120/10A launch season (FD3 rendezvous). Time for the burn: 3:34pm EDT; delta-V: 2.9 m/s (9.5 ft/s); delta-H: 4.9 km (2.7 nmi).

*Progress 25P Timeline Overview:* After undocking on 9/18, 25P is remaining in orbit for six days to conduct science experiments of ground viewing/studying plasma particles in the exhaust from a series of thruster firings (one per day) at various stages of flight:

----- *Today, 9/23* –

4:06am: Progress Burn #6 (DPO, 5s, dV~0.85 m/s, posigrade)

----- *Monday, 9/24* –

4:26pm: Progress Burn #7 (DPO, 5s, dV~0.85 m/s, posigrade)

----- *Tuesday, 9/25* –

3:13pm: Progress Deorbit burn start (SKD, 170s, dV~85.3 m/s)  
3:15:30pm: Deorbit burn complete  
3:48:12pm: Entry Interface  
[SKD = Main Engine; DPO = Approach & Attitude Control thrusters]

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:48am EDT [= epoch]):

Mean altitude -- 338.9 km  
Apogee height -- 345.8 km  
Perigee height -- 332.1 km  
Period -- 91.31 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0010184  
Solar Beta Angle -- 33.8 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in the last 24 hours -- 70 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 50629

**Significant Events Ahead** (all dates Eastern and subject to change):

09/24/07 -- ISS reboost (3:34pm, dV=2.9 m/s; set-up f/Soyuz launch & 10A FD3 rendezvous) **new time**  
09/25/07 -- Soyuz 14S thruster test (~9:00am)  
09/25/07 -- Progress M-60/25P deorbit burn & entry over Pacific -- ~3:48pm  
09/27/07 -- Soyuz TMA-10/14S relocate to SM aft port (~3:20-4:00pm) – FRR: 9/24  
09/28/07 -- FGB solar arrays retraction  
10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~11:00am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
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07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/22/07  
**Date:** Saturday, September 22, 2007 2:33:53 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/22/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- off-duty day for CDR Yurchikhin, FE-1 Kotov and FE-2 Anderson except for housekeeping and voluntary work.*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, the CDR and FE-1 performed preventive maintenance cleaning on the V3 fan screen in the DC1 (Docking Compartment) and on the VPkhO, VdPrK, VPrK & TsV2 fan grilles in the FGB.

For his voluntary "Saturday Science" session, FE-2 Anderson worked with the new ANITA (Analyzing Interferometer for Ambient Air) payload. *[After first switching the equipment via the ANITA user interface software from local sampling mode to non-local sampling, Clay used a hand pump and sample bags to collect two non-local samples, one from in front of the ANITA air flushing unit's gas inlet and the other from the middle of the Node, for subsequent analysis in the ER4 (EXPRESS Rack 4) ANITA drawer. Developed by ESA, ANITA is a potential next-generation trace-gas analysis system that uses a Fourier-Transform Infrared (FTIR) spectrometer to determine concentrations of up to 32 different trace gases in the cabin atmosphere (measuring absorbance vs. wavelength). ANITA provides continuous, automatic air sampling from its location in ER4, taking one local sample every 6 minutes, for medical personnel during the first ten days, later for environmental specialists. Data are stored on the ANITA laptop hard drive, with a*

*representative data set downlinked daily by ground command.]*

At ~9:10am EDT, the crewmembers held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Time again for recharging the Motorola-9505 Iridium satellite phone brought up on Soyuz 14S, a monthly routine job. FE-1 Kotov took care of the recharge, completing the process and cleaning up at about 12:45pm EDT. *[After retrieving it from its location in the Soyuz TMA-10/14S descent module (BO), Oleg initiated the recharging of its lithium-ion battery, monitoring the process every 10-15 minutes as it took place. Upon completion, the phone was returned inside its SSSP Iridium kit and stowed it back in the BO's operational data files (ODF) container. The satphone accompanies returning ISS crews on Soyuz reentry & landing for contingency communications with SAR (Search-and-Rescue) personnel after touchdown. The Russian-developed procedure for the monthly recharging has been approved jointly by safety officials. During the procedure, the phone is left in its fire-protective fluoroplastic bag with open flap.]*

After lunch (~10:30am), Clay Anderson filled out the regular FFQ (Food Frequency Questionnaire), his eleventh, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

The FE-2 performed the daily assist of the ongoing SAME (Smoke Aerosol Measurement Experiment) investigation, powering up the MSG (Microgravity Science Glovebox) facility and MLC (MSG Laptop Computer) and changing out the SAME sample carousel, thermal precipitator, digital video tape, and alcohol wick. *[All items except for the latter will be returned to Earth on 10A.]*

Fyodor Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The crewmembers worked out according to their regular daily physical exercise program (about half of which is used for setup & post-exercise personal hygiene); on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2) and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later, the FE-2 will copy the crew's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second task from the voluntary work list for Oleg was the periodic use of the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

Another job item on Kotov's discretionary list for today was another radiation data monitoring & logging session for flow & dose power data with the Matryoshka-R radiation payload and its LULIN-5 electronics box. Accumulated readings were recorded on a log sheet for subsequent downlink to TsUP/Moscow via the BSR-TM payload data channel.

For CDR Yurchikhin, the discretionary task list for today called for another session of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature. *[Photo targets were the Panama Canal, Patagonia ice field, and the Waddell Sea with observation of icebergs.]*

The CDR and FE-1 had their weekly PFCs (Private Family Conferences) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop), Fyodor at 7:00am EDT, Oleg at 8:15am.

At ~9:50am, Yurchikhin and Kotov also conducted a private crew-choice conference with colleagues at TsUP on S-band/audio and Ku-band/video.

*Vozdukh Valve Failure:* Yesterday morning the Vozdukh apparatus stopped with an indication of a failed #1 vacuum valve (BVK1). The crew checked valve positions and successfully restarted the CO<sub>2</sub> scrubber. Russian specialists have confirmed that the BVK1 is near end of its life and will be used as long as it can be

recovered. A spare valve is onboard. ppCO<sub>2</sub> (Carbon Dioxide Partial Pressure) was acceptable at 3 mmHg, and Vozdukh is operating.

*Progress 25P Timeline Overview:* After undocking on 9/18, 25P is remaining in orbit for six days to conduct science experiments of ground viewing/studying plasma particles in the exhaust from a series of thruster firings (one per day) at various stages of flight:

-----*Today, 9/22* –

3:45am: Progress Burn #5 (DPO, 5s, dV~2.6 m/s, posigrade)

-----*Sunday, 9/23* –

4:06am: Progress Burn #6 (DPO, 5s, dV~0.85 m/s, posigrade)

-----*Monday, 9/24* –

4:26pm: Progress Burn #7 (DPO, 5s, dV~0.85 m/s, posigrade)

-----*Tuesday, 9/25* –

3:13pm: Progress Deorbit burn start (SKD, 170s, dV~85.3 m/s)

3:15:30pm: Deorbit burn complete

3:48:12pm: Entry Interface

[SKD = Main Engine; DPO = Approach & Attitude Control thrusters]

### **Weekly Science Update** (*Expedition Fifteen -- 22<sup>nd</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* On 9/17, the CDR nominally performed a memory card exchange. ALTEINO instrument continues to nominally acquire radiation levels in the SM.

*ANITA:* “Clay, thanks for a successful ANITA set-up session in week 21. The video tour you provided was fantastic and much appreciated by the ground team.”

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2:* Completed.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS):* Continuing,

*CFE (Capillary Flow Experiment):* Reserve.

*CHROMOSOME-2 (E14 SFP):* Completed.

*CSI-2/CGBA (CGBA Science Insert #2/Commercial Generic Bioprocessing Apparatus):* Images from CHab show good Yeast growth on Side 1. Images from Cell Culture Hab show good plant cell growth on Side 1 as well. The seeds in Plant

Hab have not germinated yet after 14 days. Options for increasing moisture to the seeds are being tested on the ground units.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* Complete.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Next scheduled operation is 10/29-11/3.

*EMCH (Elastic Memory Composite Hinge):* Complete.

*EPO (Educational Payload Operation) Kit C:* Planned.

*IMMUNO (Saliva Sampling):* First session samples are currently stowed in MELFI Dewar #2.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* Since last report on 9/13, the EMCS (European Modular Cultivation System) facility experienced several issues with its VPU (Video Processing Unit), which led to several period of non availability of video recording capability. Moreover, EMCS situation got worse as its MMU (Mass Memory Unit) seems corrupted. This issue leads to additional lock-up events of the SPLC (Standard Payload Computer). A safety feature of EMCS, linked to sensors monitoring the partial pressure of O<sub>2</sub>, also triggers sporadically the powering off of EMCS sub-systems. On 9/20, the VPU locked up again, and with the MMU corrupted state, N-USOC team has lost the capability to acquire any video. This might have a severe science impact if not restored in the next days. Assuming a full fix of the EMCS software problems (plan is in work between N-USOC and POIC), the science team expects to get back video capability to observe critical growth phases of the plants and their circumnutation. The assessment of the plant development is very difficult without images.

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* Ongoing.

*NEOCYTOLYSIS (E14 SFP)*: Completed.

*NOA-2 (Nitric Oxide Analyzer)*: Planned.

*NUTRITION*: In progress.

*PMDIS (Perceptual Motor Deficits in Space)*: Complete.

*SAMPLE*: Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems)*: n/a

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight)*: “Clay, thanks for completing your fourth Actiwatch download/initialization. Monday you will start your last week of required sleep logging. Any additional logging is above and beyond and will be greatly appreciated. After completing the required sleep logging, you will only have one more download/initialization session left for this increment. In that session, you will also be initializing an Actiwatch for Peggy before she arrives.”

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite)*: Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft)*: “Clay, thank you very much for your help troubleshooting the SWAB Air Sampling Device. Without your assistance, we would not have been able to successfully finish this session, which was the 8<sup>th</sup> and final SWAB Air and Surface Sampling Session! We can’t wait to get all of the samples you took back on the ground for analysis to see what you found up there. Again, the SWAB team appreciates all you have done to help us complete our experiment.

*TRAC (Test of Reaction & Adaptation Capabilities)*: Planned.

*CEO (Crew Earth Observations)*: Through 9/15 the ground has received a total of 14,227 CEO images for review and cataloging for Increment 15. From the 512 frames of new imagery received this week by the ground team, images identified for prioritized review were those whose camera times were corresponding to the request times for the following CEO targets: Andrews Forest, Washington; Arkenu Impact Site, Libya; and Mt. Whitney, California. “We are pleased to report your success in acquiring imagery of Kabul, Afghanistan that meets or exceeds our requirements for this target and we can retire it. Your 9/5 view of one of the “Palm Islands” on the coast of the United Arab Emirates made the Top Ten List of images hits on our external website <http://eol.jsc.nasa.gov/> with just over 1,000 downloads.”

Today's CEO (Crew Earth Observation) photo targets were **Antarctic Ice Pack** (*looking to the right of track as ISS approached Antarctica for opportunities to photograph ice fragments through the cloud cover. There were two overflight opportunities*), and **Hurricane Ivo, Pacific Ocean** (*Dynamic Event. The crew had a near-nadir pass over Hurricane Ivo, predicted to still be at Category 1 strength at the time of their approach. The storm is compact, and is predicted to be located near the southern tip of Baja California. Cloud banding is likely to be the most obvious feature of the storm, as it will be beginning to weaken*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:28am EDT [= epoch]*):

Mean altitude -- 339.0 km

Apogee height -- 345.7 km

Perigee height -- 332.3 km

Period -- 91.32 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0009964

Solar Beta Angle -- 29.9 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 58 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50613

**Significant Events Ahead** (*all dates Eastern and subject to change*):

09/24/07 -- ISS reboost (2:05pm,  $dV=3.4$  m/s; set-up f/Soyuz launch & 10A FD3 rendezvous)

09/25/07 -- Soyuz 14S thruster test (~9:00am)

09/25/07 -- Progress M-60/25P deorbit burn & entry over Pacific -- ~3:48pm

09/27/07 -- Soyuz TMA-10/14S relocate to SM aft port (~3:20-4:00pm) – FRR: 9/24

09/28/07 -- FGB solar arrays retraction

10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~11:00am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite in orbit, on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)

04/??/09 -- **Six-person crew on ISS**

04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/21/07  
**Date:** Friday, September 21, 2007 1:03:45 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/21/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, CDR Yurchikhin, FE-1 Kotov and FE-2 Anderson conducted another session of the Russian biomedical routine assessments PZEh-MO-7/Calf Volume Measurement and PZEh-MO-8/Body Mass Measurement (tenth time for CDR & FE-1, seventh for FE-2), using the IM mass measurement device which Oleg Kotov afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

Clay Anderson performed the standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, using the DCS-760 digital still camera with 400 & 800mm lenses at SM windows 6 & 8 (facing in flight direction) to take CEO (Crew Earth Observations) target imagery with manual & auto focusing. Afterwards, the obtained OBT images were downlinked to the ground for analysis. *[The skill training prepares crewmembers for the bottom-side mapping of the Orbiter at the arrival of the Shuttle (STS-120/10A next). During the RPM at ~600 ft from the station, the "shooters" have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on Discovery, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photogs and the Shuttle pilot.]*

Concluding yesterday's on-board observations of Progress M-60/25P thruster plumes with the geophysical GFI-1 Relaksatsiya ("relaxation") experiment, Yurchikhin disassembled the GFI-1 hardware and returned it to stowage. Observations of the Progress engine firings are continuing from the ground. *[The 25P cargo ship is continuing its independent flight until 9/25 (timeline see below) in support of a space/time study of UV (ultraviolet) radiation patterns of engine burns at high altitude. The spectroscopic observations deal with the study of the chemoluminescent chemical reactions and atmospheric light phenomena (emissions, i.e., molecular relaxation processes), including those that occur during high-velocity interaction between the exhaust products from space vehicles and the atmosphere at orbital altitude and during the entry of space vehicles into the Earth's upper atmosphere.]*

CDR Yurchikhin and FE-1 Kotov each performed the Russian MBI-21 PNEVMOKARD experiment, their fourth on-orbit session (which forbids moving or talking during data recording). The experiment is controlled from the RSE-Med A31p laptop, equipped with new software, and uses the TENZOPLUS sphygmomanometer to measure arterial blood pressure. The FE-1 took documentary photography of his crewmate as subject for downlinking via BSR-TM or OCA. *[PNEVMOKARD (Pneumocard) is an attempt to obtain new scientific information to refine the understanding about the mechanisms used by the cardiorespiratory system and the whole body organism to spaceflight conditions. By recording (on PCMCIA cards) the crewmember's electrocardiogram, impedance cardiogram, low-frequency phonocardiogram (seismocardiogram), pneumotachogram (using nose temperature sensors), and finger photoplethysmogram, the experiment supports integrated studies of (1) the cardiovascular system and its adaptation mechanisms in various phases of a long-duration mission, (2) the synchronization of heart activity and breathing factors, as well as the cardiorespiratory system control processes based on the variability rate of physiological parameters, and (3) the interconnection between the cardiorespiratory system during a long-duration mission and the tolerance of orthostatic & physical activities at the beginning of readaptation for predicting possible reactions of the crewmembers organism during the their return to ground.]*

FE-2 Anderson successfully completed the last day (of 4) of the ITCS (Internal Thermal Control System) coolant remediation in the US Segment. *[Clay removed the Buffer Delivery Applicator (BDA) from its LAB105 location, relieving pressure with a spare ITCS Coolant Sampling Adapter, and the Fluid System Servicer (FSS), draining its Fluid Control Pump Assembly (FCPA) & jumpers and purging them to vacuum. The FSS was then stowed and the BDA packed for return on 10A. Background: In order to reduce or prevent precipitate formation, corrosion & microbial growth, the ITCS coolant fluid is being checked regularly for staying within desired chemistry and pH level constraints. After the failure of an MTL pump in*

*2003 due to nickel phosphate deposits, the ITCS coolant remediation plan includes removal of these elements, started with the temporary installation of Nickel Removal Assemblies (NiRA-1 & NiRA-2) earlier on Expeditions 14/15, and on 9/18 of the Phosphate Removal Assembly (PhosRA), removed again on 9/19. The BuDA was installed on 9/19 for raising the system pH, and the FSS on 9/18 to support the coolant fillings.]*

Afterwards, Anderson reconfigured deployed items (i.e., laptops) and stowage on the LAB1S6 (starboard) & LAB1P6 (port) racks which had to be cleared off on 9/18 for the ITCS remediation activities. *[Laptops remain powered and connected to the network.]*

Yurchikhin and Kotov performed a major maintenance job in the SM and FGB, removing four sets of faulty IP-1 flow meters and replacing them with new spares. *[The work involved R&R of associated flow converters (PP) & voltage converters (PN), disconnecting & reconnecting cabling, temporarily turning off the BITS2-12 onboard measurement telemetry system & VD-SU control mode, taking photographs of each IP-1 set for downlinking via OCA, and updating hardware relocations in the IMS (Inventory Management System). The four IP-1 locations are at the RO-PkhO (Work Compartment-Transfer Compartment) hatch, PkhO-DC1 hatch & PkhO-FGB tunnel in the SM, and at the PGO-GA (Instrumentation Cargo Compartment-Pressurized Adapter) hatch in the FGB.]*

Afterwards, the CDR supported the ground in reactivating the Elektron O<sub>2</sub> (oxygen) generator, which had to be turned off to allow the temporary disabling of the BITS2-12 Onboard Telemetry Measurement System. *[Reactivation was at 32 amps. As usual Fyodor monitored the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Oleg Kotov conducted the periodic microbial sampling in the Russian Segment, using a special test tube kit for collecting surface swabs in FGB and SM. *[Sampled sites were: in the FGB behind panels covering TCS pipes, the FGB hull, a GZhT gas-liquid heat exchanger outlet, a pump panel and soiled areas; and in the SM on the RO-PrK (Transfer Tunnel) endcone surface.]*

Anderson had another 2 hrs reserved for prepacking cargo for return to Earth on 10A.

Later today, the FE-2 will perform the daily shutdown of the MSG SAME

(Microgravity Science Glovebox/Smoke Aerosol Measurement Experiment), closing the VES (Vacuum Exhaust System) and GN<sub>2</sub> (Gaseous Nitrogen) valves in the MSG WV (Work Volume) and turning off the experiment's power (120V).

CDR Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM.

Fyodor is also scheduled to update/edit the standard daily IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The FE-2 did the regular bi-weekly maintenance reboot of the SSC (Station Support Computer) OCA Comm Router laptop.

Clay will also perform the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries are to be replaced if necessary. *[Purpose of the 10-min. activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements. Two CSA-CP (CSA-Combustion Products) instruments recorded CO, HCN and HCl readings at the SM Central Post (#1060, prime) and in the Node (#1057, backup), while the CSA-O<sub>2</sub> units (#1063, #1042) looked for O<sub>2</sub> in the Lab and the CDMK (#1008) for CO<sub>2</sub> in SM and Lab. Also recorded were battery ticks. The instruments were turned off afterwards, except for the prime CSA-CP #1060 unit, and returned to their regular locations. The CSA-CPs also have O<sub>2</sub> sensors but they are out of calibration and their readings are currently omitted.]*

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-1, FE-2), and VELO cycle with bungee cord load trainer (CDR).

Later in the afternoon, Clay transfers the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week). *[Troubleshooting of the heart rate watches is underway on the ground for improving data transfer to the chest strap transmitters.]*

Working from the Russian discretionary “time permitting” task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second task from the voluntary work list for Oleg was the regular status check on the long-term BIO-5 Rasteniya-1 (“Plants-1”) micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

At ~4:20am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~4:35am, Fyodor and Oleg linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing stowage issues and equipment locations.

At ~11:00am, Clay powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), to conduct, at 11:05am a ham radio exchange with students at Pueblo Magnet High School in Tucson, AZ. Questions to the crew were uplinked by ARISS (Amateur Radio on ISS) beforehand. *[“Pueblo High School may be best described as a pueblo: an intimate village whose inhabitants most often learn about the larger world only as it comes to them. The bias of being a “south side school” has a negative effect on teen’s self-esteem, teachers’ morale and the potential for our program. A large percentage of the students are basically poor, coming from undereducated environments. Administration, teachers and staff at Pueblo Magnet High School work very hard to build a positive reputation that is challenged daily by the reality of neighborhood violence, dropout statistics, low socioeconomic status and low achievement. Touch the Sky is a project that has been underway for almost two years and that has as a primary objective, Pueblo Magnet High School students communicating, via amateur radio technologies, with astronauts aboard the International Space Station.” “How many times have you orbited earth since you boarded the ISS?”; “Based on your present space experiences, do you believe there is human life on another planet?”; “How does loss of gravity affect your digestive system and how do you eliminate bodily wastes?”; “What is your sense of awe and wonderment of nature in outer space?”; “Is it possible for people to build a station on the moon for people to live in?”; “Do cell phones work in outer space?”]*

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio will be conducted at ~3:50pm.

Later, at ~4:20pm, the crew will also convene for their weekly teleconference with ISS Program Management at JSC/Houston via S-band/audio.

*Potable Water Update:* A second Contingency Water Container, CWC #1074, with 43L, has now been declared off-limits for crew consumption due to bacteria found in postflight analysis, as in CWC #1081 (42.9L). Ground teams are assessing the allowable uses for these CWCs.

*Progress 25P Timeline Overview:* After undocking on 9/18, 25P is remaining in orbit for six days to conduct science experiments of viewing/studying plasma particles in the exhaust from a series of thruster firings (one per day) at various stages of flight:

----- Today, 9/21 –

4:59pm: Progress Burn #4 (DPO, 5s,  $dV \sim -2.6$  m/s, retrograde)

----- Saturday, 9/22 –

3:45am: Progress Burn #5 (DPO, 5s,  $dV \sim 2.6$  m/s, posigrade)

----- Sunday, 9/23 –

4:06am: Progress Burn #6 (DPO, 5s,  $dV \sim 0.85$  m/s, posigrade)

----- Monday, 9/24 –

4:26pm: Progress Burn #7 (DPO, 5s,  $dV \sim 0.85$  m/s, posigrade)

----- Tuesday, 9/25 –

3:13pm: Progress Deorbit burn start (SKD, 170s,  $dV \sim 85.3$  m/s)

3:15:30pm: Deorbit burn complete

3:48:12pm: Entry Interface

*[SKD = Main Engine; DPO = Approach & Attitude Control thrusters]*

Today's CEO (Crew Earth Observation) photo targets were **Antarctic Ice Pack** (*looking to the right of track for breaks in cloud cover as ISS approached Antarctica. Large ice fragments from the retreating Antarctic ice pack may be visible through any gaps. The density of ice fragments on the sea surface, and morphology of the ice fragments themselves, is of interest for understanding ice pack dynamics*), and **Lake Poopo, Bolivia** (*cloud cover was predicted to be minimal for this morning pass close to Lake Poopo. The region has experienced significant rainfall over the past month, and water levels should be up in the Lake. Looking to the left of track for Poopo and smaller salars [dry lakes] in the vicinity; mapping of shorelines in water-filled lakes is of particular interest*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are

downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:06am EDT [= epoch]*):

Mean altitude -- 339.1 km  
Apogee height -- 345.8 km  
Perigee height -- 332.3 km  
Period -- 91.32 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0010049  
Solar Beta Angle -- 25.8 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in the last 24 hours -- 50 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 50597

**Significant Events Ahead** (*all dates Eastern and subject to change*):

09/24/07 -- ISS reboost (2:05pm,  $dV=3.4$  m/s; set-up f/Soyuz launch & 10A FD3 rendezvous)  
09/25/07 -- Soyuz 14S thruster test (~9:00am)  
09/25/07 -- Progress M-60/25P deorbit burn & entry over Pacific -- ~3:48pm  
09/27/07 -- Soyuz TMA-10/14S relocate to SM aft port (~3:20-4:00pm) – FRR: 9/24  
09/28/07 -- FGB solar arrays retraction  
10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~11:00am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/20/07  
**Date:** Thursday, September 20, 2007 1:23:04 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/20/07**

All ISS systems continue to function nominally, except those noted previously or below.

In the "Pirs" Docking Compartment (DC1), CDR Yurchikhin and FE-1 Kotov replaced the BSS-4 Orlan Interface Unit with its BUS-MK Control Unit plus other equipment, as they had done yesterday in the SM PkhO (Service Module/Transfer Compartment) for similar EVA gear which had reached its service life of six years. A leak check concluded the activities.

FE-2 Anderson successfully completed Day 3 (of 4) of the ITCS (Internal Thermal Control System) coolant remediation in the US Segment. *[Clay replaced the LTL & MTL (Low & Moderate Temperature Loop) fine filters and the LTL Gas Trap which was approaching its service life limit, topped off coolant, and collected a fluid sample as post-remediation "snapshot". He also equalized the Buffer Delivery Applicator (BDA). Background: In order to reduce or prevent precipitate formation, corrosion & microbial growth, the ITCS coolant fluid is being checked regularly for staying within desired chemistry and pH level constraints. After the failure of an MTL pump in 2003 due to nickel phosphate deposits, the ITCS coolant remediation plan includes removal of these elements, started with the temporary installation of Nickel Removal Assemblies (NiRA-1 & NiRA-2) earlier on Expeditions 14/15, and on 9/18 of the Phosphate Removal Assembly (PhosRA), removed again yesterday. The BuDA, installed yesterday for raising the system pH, and the Fluid System Servicer (FSS) will be removed tomorrow (9/21).]*

As the Progress M-60/25P cargo ship is continuing its independent flight until 9/25 (timeline see below), CDR Yurchikhin is supporting its scientific research activities today with the geophysical GFI-1 Relaksatsiya ("relaxation") experiment. GFI-1 will be torn down tomorrow, but spectroscopic observations of the engine plumes will be continued from the ground. *[After unstowing and setting up the equipment from six GFI-1 hardware kits, reconfiguring the payload Laptop 3 for the experiment and*

*mounting the UV (ultraviolet) camcorder with its SP spectrometer unit at SM (Service Module) window #9, Yurchikhin initially records imagery of nocturnal radiation from the Earth surface and atmosphere at ~2:30pm EDT, then again before, during and after the Progress DPO thruster firing at 4:37pm EDT. Purpose of the experiment is to contribute to a space/time study of UV (ultraviolet) radiation patterns from the Earth and from engine burns at high altitude. Relaksatsiya normally deals with the study of the chemoluminescent chemical reactions and atmospheric light phenomena (emissions, i.e., molecular relaxation processes), including those that occur during high-velocity interaction between the exhaust products from space vehicles and the atmosphere at orbital altitude and during the entry of space vehicles into the Earth's upper atmosphere.]*

Working in the starboard SM crew quarters, FE-1 Kotov checked out cabling and connections of an SD1-6 lighting unit and its power supply box, using the "Elektronika" multimeter for continuity checks. A short circuit was found, and the unit is to be replaced.

In the Lab module, FE-2 Anderson started the long-term operation of the ANITA (Analyzing Interferometer for Ambient Air) experiment, powering up the equipment in EXPRESS Rack (ER4) and initiating local sampling mode. *[Developed by ESA, ANITA is a potential next-generation trace-gas analysis system that uses a Fourier-Transform Infrared (FTIR) spectrometer to determine concentrations of up to 32 different trace gases in the cabin atmosphere (measuring absorbance vs. wavelength). ANITA provides continuous, automatic air sampling from its location in ER4, taking one local sample every 6 minutes, for medical personnel during the first ten days, later for environmental specialists. Data are stored on the ANITA laptop hard drive, with a representative data set downlinked daily by ground command. For next weekend's Saturday Science, Clay has selected to take a non-local air sample from another station location (pumped by hand into a sample bag) for subsequent analysis in the ER4 ANITA drawer.]*

Continuing the current round of monthly preventive maintenance of RS (Russian Segment) ventilation systems, Fyodor Yurchikhin cleaned the four "Group B" fan grills (VT1, VT2, VTK1, VTK2) in the SM.

Anderson conducted the weekly 10-min. CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card, to be updated with today's data, lists 29 water containers (~1099 liters total) for the four types of water identified on board: technical water (715.9 l, for Elektron, flushing, hygiene), potable water (351.2 l), condensate water (13.2 l), waste/EMU dump and other (19.0 l. CWC #1081 with potable water has been put off limits due to bacteria found in sample analysis, the*

*source of which is still not understood. Plans are to check the water on-orbit next month and to test the SRV-K sterilization procedures on the ground. CWC #1081 will be used as flush water. Impact of losing this potable CWC is negligible since there are sufficient drinking water supplies onboard.]*

With the U.S. CDRA (Carbon Dioxide Removal Assembly) deactivated by the ground earlier today (8:30am-1:30pm) and cooling no longer required, Clay Anderson demated and took down the ITCS LTL jumper at the CDRA-supporting LAB1D6 rack.

Oleg Kotov performed the periodic data collection and downlink on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse.

At ~10:00am, the FE-2 held a teleconference with ground specialists to discuss STS-120/10A return cargo preparations, based on IMS (Inventory Management System), and afterwards had 1h 25m reserved for prepacking/staging hardware for return on 10A.

CDR Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM.

Fyodor also updated/edited the standard daily IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO cycle with bungee cord load trainer (FE-1).

Later today, Clay will transfer the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week). *[Troubleshooting of the heart rate watches is underway on the ground for improving data transfer to the chest strap transmitters.]*

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for*

*the duration of Expedition 15.]*

At ~12:15pm EDT, the crew conducted a PAO TV interview exchange with KPTM-TV (Scott Lea), Omaha, Nebraska. *[Nebraska is Clayton Anderson's home state.]*

Later today, at ~2:05pm, the crew will convene for their weekly teleconference with ISS Program Management at JSC/Houston via S-band/audio.

*Propellant Transfer:* TsUP/Moscow was scheduled today to perform transfer of fuel (UDMH, unsymmetrical dimethyl hydrazine) from the Progress M-61/26P cargo ship's BG1,2 refueling tanks to the SM's BG1 tank, while pumping out N<sub>2</sub> using the K2 compressor.

*Progress 25P Timeline Overview:*

After undocking on 9/18, 25P is remaining in orbit for six days to conduct science experiments of viewing/studying plasma particles in the exhaust from a series of thruster firings (one per day) at various stages of flight:

-----*Today, 9/20* –

4:37pm: Progress Burn #3 (DPO thrusters, 5s, dV~2.6 m/s)

-----*Friday, 9/21* –

4:59pm: Progress Burn #4 (DPO, 5s, dV~-2.6 m/s, retrograde)

-----*Saturday, 9/22* –

3:45am: Progress Burn #5 (DPO, 5s, dV~2.6 m/s, posigrade)

-----*Sunday, 9/23* –

4:06am: Progress Burn #6 (DPO, 5s, dV~0.85 m/s, posigrade)

-----*Monday, 9/24* –

4:26pm: Progress Burn #7 (DPO, 5s, dV~0.85 m/s, posigrade)

-----*Tuesday, 9/25* –

3:13pm: Progress Deorbit burn start (SKD, 170s, dV~85.3 m/s)

3:15:30pm: Deorbit burn complete

3:48:12pm: Entry Interface

*[SKD = Main Engine; DPO = Approach & Attitude Control thrusters]*

Today's CEO (Crew Earth Observation) photo targets were **B.P. Structure, Libya** (*this young [ $<120$  million years] impact structure is located to the west of a large dune field, between two roughly N-S mountain ranges comprised of dark materials.*

*The crater is a small feature, therefore the crew was recommended to shoot a W-E mapping swath as ISS approached the target area to maximize coverage and photograph the crater), Oasis Impact Crater, Libya* (*the Oasis impact structure is much larger [18 km] than the nearby BP crater [previous target] but is approximately the same age. Oasis crater is located a little to the south of the BP structure, and the photographic strategy was the same - a mapping swath from W to E as ISS*

passed over the target area should have captured the crater), **Khartoum, Sudan** (the station had a nadir pass over the capital of Sudan. Overlapping nadir frames, acquired along-track, were requested to minimize pixel smear in the resulting images. Khartoum is located at the confluence of the White and Blue Nile rivers. A rural-urban-rural transect across the city area [photography along-track will achieve this] would be most useful for quantitative land cover/land use analysis. The crew was to begin mapping as they approached the White Nile River, collecting frames as ISS flew over the city, then terminating photography as ISS entered the agricultural fields to the SE of the urban area), and **Antarctic Ice Pack** (looking to the right of track as the station approached Antarctica for breaks in the cloud cover. Drifting fragments of the Antarctic ice pack may have been visible through gaps in the clouds).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 9:08am EDT [= epoch]):

Mean altitude -- 339.1 km  
Apogee height -- 345.8 km  
Perigee height -- 332.4 km  
Period -- 91.32 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0010022  
Solar Beta Angle -- 21.5 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in the last 24 hours -- 52 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 50582

**Significant Events Ahead** (all dates Eastern and subject to change):

09/24/07 -- ISS reboost (2:05pm,  $dV=3.4$  m/s; set-up f/Soyuz launch & 10A FD3 rendezvous)  
09/25/07 -- Soyuz 14S thruster test (~9:00am)  
09/25/07 -- Progress M-60/25P deorbit burn & entry over Pacific -- ~3:48pm  
09/27/07 -- Soyuz TMA-10/14S relocate to SM aft port (~3:20-4:00pm) – FRR: 9/24  
09/28/07 -- FGB solar arrays retraction  
10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~11:00am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.

10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/19/07  
**Date:** Wednesday, September 19, 2007 2:27:58 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/19/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-2 Anderson continued with Day 2 of the ITCS (Internal Thermal Control System) coolant remediation in the US Segment (USOS). *[Today Clay removed the PhosRA (Phosphate Removal Assembly) which he put in yesterday, installed the BuDA (Buffer Delivery Applicator), performed PhosRA pressure relief at the O5 rack, and was to replace the LTL fine filter if expected precipitate formation was clogging it. Background: In order to reduce or prevent precipitate formation, corrosion & microbial growth, the ITCS coolant fluid is being checked regularly for staying within desired chemistry and pH level constraints. After the failure of an MTL (Moderate Temperature Loop) pump in 2003 due to nickel phosphate deposits, the ITCS coolant remediation plan includes removal of these elements, started with the temporary installation of Nickel Removal Assemblies (NiRA-1 & NiRA-2) earlier on Expeditions 14/15, and yesterday of the PhosRA. BuDA (for raising the system pH) and the FSS (Fluid System Servicer) will be removed on Friday (9/21).]*

Afterwards, Anderson completed the installation of an Intermodular Ventilation (IMV) valve of the Temperature & Humidity Control (THC) system in the Lab Forward Port Endcone (LAB1PO). *[The 1-hr. activity included installing a missing hose clamp, tightening an RMO (Remote Manual Operator) fastener, and installing RMO identification labels.]*

In the SM PkhO (Service Module/Transfer Compartment) and DC1 (Docking Compartment), CDR Yurchikhin and FE-1 Kotov worked on the Orlan EVA support equipment, removing & replacing major Orlan/spacesuit servicing hardware with new units, viz., the BSS-4 Orlan Interface Unit with BUS-MK control unit, oxygen line, Orlan hose bundles I & II, and Orlan emergency hoses. *[Halfway through the R&R, the BITS2-12 onboard telemetry measurement system and associated VD-SU control mode were turned on to allow ground monitoring of the activity, which*

*concluded with a leak check of the BSS-4 and its hose bundles.]*

Later, Kotov supported TsUP/Moscow in reactivating the Elektron oxygen generator, which had to be turned off for BITS2-12 and VD-SU deactivation during the preceding BSS-4 R&R. *[Reactivation was at 32 amps, and as usual Oleg monitored the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Clay Anderson unstowed the equipment for the final NASA/U.o.Nevada SWAB (Surface, Water & Air Biocharacterization) sampling and at several times during the day collected air samples at four locations in the Node and Lab, followed by taking surface samples from several locations in Node, Lab and Airlock plus five random sites (e.g., air vents). *[The samples were sealed in special SWAB tubes, labeled as to their location origins and prepared for return to Earth on 10A. SWAB started on Increment 13 before 12A docking.]*

Oleg Kotov meanwhile collected the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

For Day 2 of the new KL-211 MPEG-2 Encoder end-to-end testing, Yurchikhin and Kotov activated the RSS1 A31p laptop (for monitoring the digital video) and the U.S. SSC (Station Support Computer) laptop (for converting analog TV from Russian PAL mode to U.S. NTSC), set up the video hardware and conducted the transmission tests with the KL-211 in the new JSL (Joint Station LAN) configuration, via U.S. OCA/Ku-Band. *[Testing included launching the NViewer (NASA Viewer) application on the Central Post SSC (Station Support Computer) laptop and the VLC Media Player on the RSS1 laptop, linking KL-211 to various video cameras onboard, and checking the digital video transmission over JSL/Ethernet plus OCA/Ku-Band to MCC-Houston and from there to Moscow via the ESA Gateway at TsUP, versus same-scene analog video signals transmitted via Streambox to NISN (i.e., the Moscow Ostankino communication hub).]*

The FE-2 performed the daily start-up of the ongoing SAME (Smoke Aerosol Measurement Experiment) investigation, powering up the MSG (Microgravity Science Glovebox) facility and MLC (MSG Laptop Computer) and changing out the SAME sample carousel, thermal precipitator, digital video tape, and alcohol wick.

*[All items except for the latter will be returned to Earth on 10A.]*

Clay also conducted the periodic status checkup & filter inspection of the running CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to Earth.]*

CDR Yurchikhin completed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water collected in CWC (Contingency Water Container) #1056 from the Lab CCAA (Common Cabin Air Assembly) dehumidifier. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

As part of the regular preventive maintenance of RS (Russian Segment) ventilation systems, Oleg worked in the Soyuz TM-10/14S spacecraft on cleaning the screen of its BVN fan/heater assembly. *[14S is to be relocated by the three crewmembers to the SM aft port on 9/27.]*

Anderson disconnected the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable at the Lab RWS (Robotics Work Station), required earlier for 25P undocking video coverage.

With SAMS (Space Acceleration Measurement System) no longer active for the moment, Clay also disconnected the ITCS MTL (Moderate Temperature Loop) cooling jumper QD (quick disconnects) at ER1 (EXPRESS Rack 1).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), and RED resistive exerciser (CDR, FE-1, FE-2).

Later today, Clay will transfer the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week). *[Troubleshooting of the heart rate watches is underway on the ground for improving data transfer to the chest strap transmitters.]*

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This*

*is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second task from the voluntary work list for Oleg (in the morning) was the regular status check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

*Progress 25P Timeline Overview:*

After undocking last night, 25P is remaining in orbit for five more days to conduct science experiments of viewing/studying plasma particles in the exhaust from a series of thruster firings (one per day) at various stages of flight:

-----Today, 9/19 –

5:52pm: Progress Burn #2 (SKD, 5s,  $dV \sim 1.5$  m/s, retrograde)

-----Tomorrow, 9/20 –

4:37pm: Progress Burn #3 (SKD, 5s,  $dV \sim 2.6$  m/s, posigrade)

-----Friday, 9/21 –

4:59pm: Progress Burn #4 (AR&D thrusters, 5s,  $dV \sim 2.6$  m/s, retrograde)

-----Saturday, 9/22 –

3:45am: Progress Burn #5 (SKD, 5s,  $dV \sim 2.6$  m/s, posigrade)

-----Sunday, 9/23 –

4:06am: Progress Burn #6 (AR&D thrusters, 5s,  $dV \sim 0.85$  m/s, posigrade)

-----Monday, 9/24 –

4:26pm: Progress Burn #7 (AR&D thrusters, 5s,  $dV \sim 0.85$  m/s, posigrade)

-----Tuesday, 9/25 –

3:13pm: Progress Deorbit burn start (170s,  $dV \sim 85.3$  m/s)

3:15:30pm: Deorbit burn complete

3:48:12pm: Entry Interface

*[SKD = Main Engine; AR&D = Automated Rendezvous & Docking]*

*Belated Anniversary Recognition:* Last month, on 8/21, was the 50<sup>th</sup> anniversary of the first successful launch of the Soviet R-7 ICBM at Tyuratam (today's Baikonur), developed at the Special Design Bureau No.1 (now S.P.Korolev RSC-Energia).

*[Original mission of this first Soviet-Russian long-range two-stage missile was to carry a nuclear warhead to any point on a potential enemy's territory. Line drawings of the rocket were approved by the Chief Designer, Sergey Pavlovich Korolev, on 3/11/1955. First successful launch, with successful target impact on Kamchatka Peninsula, took place on 8/21/57. Key developers, designers and researchers for the missile at the Special Design Bureau No.1 included B.Ye.Chertok (memoirs being published by NASA), P.I.Yermolaev, K.D.Bushuyev, and many others. The R-7 "Semyorka" became the basis for developing the first space launch vehicle*

*Sputnik, which put the world's first Earth artificial satellite into orbit 50 years ago next month (10/4/57) and for numerous modifications for space launches, including the Vostok and today's Molniya and Soyuz launch vehicles. Further development of this rocket's design (Soyuz-2 project and others) is currently underway.]*

Today's CEO (Crew Earth Observation) photo targets were **Nile River Delta, Africa** (orbit track took ISS over the western edge of the Nile delta. This region of the delta is currently the focus of urban expansion in the region. Overlapping nadir frames, acquired along-track, were requested to record land cover and land use patterns), and **Kwanza Basin, Angola** (while most of Africa stagnates economically, extraction of Angola's huge hydrocarbon reserves has started to spark economic development. In the Kwanza basin all kinds of infrastructure are planned, so that present patterns of natural vegetation, animal migration routes and human settlement will all change. Detailed baseline/"pre-change" imagery is therefore requested. Overlapping nadir frames, acquired along-track, of the SW portion of the site area will be most useful for quantitative analysis of current landscape patterns).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:46am EDT [= epoch]):

Mean altitude -- 339.2 km

Apogee height -- 345.8 km

Perigee height -- 332.5 km

Period -- 91.32 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0009891

Solar Beta Angle -- 17.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 48 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50566

**Significant Events Ahead** (all dates Eastern and subject to change):

09/24/07 -- ISS reboost (2:05pm, dV=3.4 m/s; set-up f/Soyuz launch & 10A FD3 rendezvous)

09/25/07 -- Soyuz 14S thruster test (~9:00am)

09/25/07 -- Progress M-60/25P deorbit burn & entry over Pacific -- ~3:48pm

09/27/07 -- Soyuz TMA-10/14S relocate to SM aft port (~3:20-4:00pm) – FRR: 9/24  
09/28/07 -- FGB solar arrays retraction  
10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~11:00am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 “Harmony”, racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 “Jules Verne” launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch

08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/18/07  
**Date:** Tuesday, September 18, 2007 12:59:42 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/18/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-2 Anderson prepared for his first seven-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) session, setting up the HRF1 (Human Research Facility 1) laptop and the Actiwatch Reader for subsequent data download, initializing the Actiwatch for himself, and strapping it on. *[The NASA/JSC experiment investigates the effects of long and short duration spaceflight on sleep, objectively evaluates sleep through measurement of sleep-wake activity, subjectively evaluates crewmembers' satisfaction with the amount and quality of sleep, and measures crewmembers' light exposure during spaceflight to investigate association with sleep disruption. To monitor Clay's sleep/wake patterns and light exposure, his special Actiwatch device measures the light levels encountered by her as well as her patterns of sleep and activity throughout the Expedition.]*

CDR Yurchikhin serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The regen process will be terminated at ~5:00pm EDT. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods. Filter bed 1 was regenerated yesterday.]*

The two Russian crewmembers each completed the 2-hr Part 2 of their third onboard "Profilaktika" (MBI-8, "Countermeasures") preventive health maintenance fitness test series, including ECG (Electrocardiogram), blood tests and subjective rating, assisting each other in turn. *[Today's fitness test was performed on the TVIS treadmill in unmotorized (idle) mode, with free choice of speeds within the range permitted. The test investigates the action mechanism and efficiency of various countermeasures (currently VELO and TVIS) aimed at preventing locomotor system disorders in weightlessness. The test differs from the normal TVIS session*

*by the use of the TEEM-100 gas analyzer (via a mask equipped with a pneumotachometer sensor), measurement of blood lactate level and subjective evaluation of physical exertion levels during the test. The lactate blood samples were taken twice at the end of the session, using the ACCUSPORT analyzer and REFLOTRON-4 accessories. Results were entered on a log sheet. TEEM and ECG (electrocardiograph) data were transferred to the RSE-Med laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]*

After having set up the Russian video equipment and connected the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable at the Lab RWS (Robotics Workstation) for undock coverage and transmittal via US Ku-band for video coverage, Yurchikhin and Kotov supported ground specialists at TsUP/ Moscow in a pre-undocking test of the recently installed KL-211 MPEG-2 TV Encoder in the new JSL (Joint Station LAN) configuration, via U.S. OCA. *[Testing included launching the NViewer (NASA Viewer) application on the Central Post SSC (Station Support Computer) laptop and the VLC Media Player on the RSS1 laptop, linking the KL-211 to various video cameras onboard, and checking the digital video transmission via JSL/Ethernet plus OCA/Ku-Band to MCC-Houston and from there to Moscow via the ESA Gateway at TsUP, versus same-scene analog video signals transmitted via Streambox to NISN (i.e., the Moscow Ostankino communication hub).]*

FE-2 Anderson began a major task of U.S. ITCS (Internal Thermal Control System) coolant remediation, scheduled to extend over several days (to 9/21). Today's work involved taking a pre-remediation ITCS fluid sample for return on STS-120/10A, adding coolant, and installing a Phosphate Removal Assembly (PhosRA). *[Background: In order to reduce or prevent precipitate formation, corrosion & microbial growth, the ITCS coolant fluid is being checked regularly for staying within desired chemistry and pH level constraints, After the failure of an MTL (Moderate Temperature Loop) pump in 2003 due to nickel phosphate deposits, the ITCS coolant remediation plan includes removal of these elements, started with the temporary installation of Nickel Removal Assemblies (NiRA-1 & NiRA-2) earlier on Expeditions 14/15, and today of the PhosRA. A Buffer Delivery Applicator (BuDA) for raising the system pH will be installed tomorrow. Both PhosRA and BuDA will be removed afterwards.]*

Oleg Kotov had 2h 20m reserved for conducting an inventory/audit of the Russian SVO Water Supply System, checking off ~56 individual items against an uplinked listing and the IMS (Inventory Management System), such as BRPK condensate processor gear, filters, adaptors, hoses, sample containers, water bags, etc.

Fyodor Yurchikhin also conducted an inventory/audit, of unopened food containers

stowed in the FGB, to help make manifest decisions for future flights. *[The audit included special identification/labeling of containers with expired food (dessert, pilaf, meat, cabbage, etc.) and 10 expired water bags.]*

In preparation for tonight's Progress 25P undocking, Clay Anderson activated the SAMS ICU (Space Acceleration Measurement System/Interim Control Unit) in Rack LAB1P2 for collecting microgravity acceleration and disturbance data of the undocking for structural and mechanical analysis, and later closed the Lab science window shutter as protection against thruster plumes.

For tonight's operation of SAMS, Clay also configured the ER1 (EXPRESS Rack 1) by connecting its MTL (Moderate Temperature Loop) cooling jumper QDs (quick disconnects) to the nearby LAB1O2 UIP (Utility Interface Panel, "Z-panel").

Fyodor took the periodic sensor readings of the Russian "Pille-MKS" (MKS = ISS) radiation dosimetry experiment which has ten sensors placed at various locations in the Russian segment (port cabin window, starboard cabin window, ASU toilet facility, control panel, etc.). Nine of the ten dosimeters are read manually (last time done: 8/20).

Working in the Node, the CDR removed a closeout panel, took a reading with the CSA-CO<sub>2</sub> instrument to verify no ventilation concern, and cleaned the Node IMV (Intermodular Ventilation) fan at Starboard Aft. *[In addition, Yurchikhin retrieved the Gas Trap Fill Fixture from behind the panel for use by Anderson on his extended ITCS servicing task (see above), leaving the panel open until after the ITCS work.]*

Later, Yurchikhin conducted the periodic verification of IMV airflow between U.S. and Russian segment modules by taking air flow measurements using the Velocicalc meter. *[There is no direct measurement of airflow except as reflected by differences in atmosphere partial pressures measured between the RS and USOS. ppCO<sub>2</sub> (carbon dioxide partial pressure) is a good yardstick since an increasing ppCO<sub>2</sub> in the Lab not reflected in the SM would indicate that Vozdukh is not receiving the air from the Lab at an efficient rate. Periodic air flow degradation checks support establishing a most effective fan cleaning schedule.]*

FE-1 Kotov worked on the SM's IK0501 GA (gas analyzer) of the SOGS Pressure Control & Atmospheric Monitoring System, deactivating the unit and replacing its CO<sub>2</sub> filter assembly (BF) with a new unit from FGB stowage (replaced last: 8/8).

*[After ensuring good seals on the instrument's base and no leaks around the installed filter, Oleg reactivated the GA and stowed the spent BF for disposal.]*

*IK0501 is an automated system for measuring CO<sub>2</sub>, O<sub>2</sub>, and H<sub>2</sub>O in the air as well as the flow rate of the gas being analyzed.]*

The FE-1 conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM.

Oleg also updated/edited the standard daily IMS “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers worked out according to their regular daily physical exercise program (about half of which is used for setup & post-exercise personal hygiene), the FE-2 on the TVIS treadmill and RED resistive exerciser, the CDR & FE-1 both on the TVIS as part of their MBI-8/Part 2 “Countermeasures” assessment (see above).

Later today, Fyodor will transfer the crewmembers’ exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary “time permitting” task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

*Conjunction Update:* The POC (Probability of Collision) for today’s ISS conjunction with an old “Strela” rocket body (~1:21pm EDT) was determined last night to be very low, and planning for a DAM (Debris Avoidance Maneuver) today was cancelled. *[“Strela” was the Soviet ICBM UR-100, NATO Code SS-11 Sega.]*

*Saturday Science Preview:* Five optional activities for the voluntary “Saturday Science” program for next weekend (9/22-23) were suggested to Clay for his choice. His selection is required by tonight. *[The five choices are: (1) EPO (Educational Payload Operation) Kit C Plant Growth experiment, voice and video; (2) BCAT-3 (Binary Colloidal Alloy Test-3) Magnet Unstick, using the CGBA-4 (Commercial Generic Bioprocessing Apparatus-4), powered up 12 hrs before; (3) ANITA (Analyzing Interferometer for Ambient Air) – Non-Local Sampling, using a sample bag and hand pump; (4) CFE VG1 (Capillary Flow Experiment – Vane Gap 1): voice & video of another run of to complete the CFE-VG1 experiment; and (5)*

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites), flying two & three satellites, requiring CDRA (CO<sub>2</sub> Removal Assembly) to be running.]*

*Progress M-60/25P Undocking Update:* After separation tonight at ~8:37pm EDT from the SM aft port, the 25P cargo ship remains in orbit for five more days to conduct science experiments of viewing/studying plasma particles in the exhaust from a series of thruster firings (one per day) at various stages of flight.

*25P Separation/Entry Timeline (EDT):*

*-----Today, 9/18 --*

- 6:40pm: USOS to RS Attitude Control Handover
- 8:33pm: ISS to Free Drift
- 8:34pm: 25P Undock Command
- **8:37pm: Physical Separation** (dV~0.12 m/s)
- 8:40pm: 25P Separation Burn #1 (dV~0.62 m/s)
- 8:42pm: ISS maneuvers to LVLH Attitude
- 9:20pm: RS to USOS Attitude Control Handover.

*-----Tomorrow, 9/19 --*

- 5:52pm: Progress Burn #2 (SKD, 5s, dV~-1.5 m/s, retrograde)

*-----Thursday, 9/20 --*

- 4:37pm: Progress Burn #3 (SKD, 5s, dV~2.6 m/s, posigrade)

*-----Friday, 9/21 --*

- 4:59pm: Progress Burn #4 (AR&D thrusters, 5s, dV~-2.6 m/s, retrograde)

*-----Saturday, 9/22 --*

- 3:45am: Progress Burn #5 (SKD, 5s, dV~2.6 m/s, posigrade)

*-----Sunday, 9/23 --*

- 4:06am: Progress Burn #6 (AR&D thrusters, 5s, dV~0.85 m/s, posigrade)

*-----Monday, 9/24 --*

- 4:26pm: Progress Burn #7 (AR&D thrusters, 5s, dV~0.85 m/s, posigrade)

*-----Tuesday, 9/25 --*

- 3:13pm: Progress Deorbit burn start (170s, dV~85.3 m/s)
- 3:15:30pm: Deorbit burn complete
- 3:48:12pm: Entry Interface

*[SKD = Main Engine; AR&D = Automated Rendezvous & Docking]*

Today's CEO (Crew Earth Observation) photo targets were **Polar Mesospheric Clouds--PMC, Northern Hemisphere** (PMC are wispy, veil-like ice

*clouds which can be single bands or clusters, straight or sinuous),*  
**Antarctic Ice Pack** (*cloud cover over the southern Indian Ocean diminished as ISS tracks approached Australia. Looking to the right of track [towards Antarctica] for icebergs and ice fragments on the sea surface. Clouds will tend to have variable brightness, whereas ice will have more homogeneous contrast. Images of sea ice will help track the breakup and rate of retreat of the Antarctic ice pack*), and  
**Smoke Plumes, Brazil** (*Dynamic Event. Weather satellite data indicates that extensive biomass burning and associated smoke plumes are ongoing in Central South America. Looking to the right of track after ISS passed over the Amazon river delta for smoke plumes*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:36am EDT [= epoch]*):

Mean altitude -- 339.2 km

Apogee height -- 345.7 km

Perigee height -- 332.7 km

Period -- 91.32 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0009684

Solar Beta Angle -- 12.7 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 62 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50550

**Significant Events Ahead** (*all dates Eastern and subject to change*):

09/24/07 -- ISS reboost (2:05pm,  $dV=3.4$  m/s; set-up f/Soyuz launch & 10A FD3 rendezvous)

09/25/07 -- Soyuz 14S thruster test (~9:00am)

09/25/07 -- Progress M-60/25P deorbit burn & entry over Pacific -- ~3:48pm

09/27/07 -- Soyuz TMA-10/14S relocate to SM aft port (~3:20-4:00pm) – FRR: 9/24

09/28/07 -- FGB solar arrays retraction

10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (~11:00am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC

10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/17/07  
**Date:** Monday, September 17, 2007 1:14:38 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/17/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 22 of Increment 15.*

CDR Yurchikhin serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #1 of the regenerable dual-channel filtration system. The regen process will be terminated at ~7:10pm EDT. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

The two Russian crewmembers completed a 2-hr session each of Part 1 of their third onboard "Profilaktika" (MBI-8, "Countermeasures") preventive health maintenance fitness test series, starting with the VELO stationary cycle ergometer. *[Fyodor and Oleg will do the second part of the test tomorrow (9/18) on the TVIS treadmill. Test procedure for MBI-8 is identical to the Russian MO-5 assessment, but in addition to the nominal procedure it uses the TEEM-100M gas analyzer with breathing mask, a blood lactate test with the ACCUSPORT analyzer and REFLOTRON-4 accessories, and a subjective evaluation of physical exertion levels during the test (using the Borg Perceived Exertion Scale, viz., 10 steps from very light over hard and very hard to maximum). Results are entered on a log sheet. TEEM and ECG (electrocardiograph) data are transferred to the RSE-Med Laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]*

FE-1 Kotov spent about 30 min of regular equipment servicing in the SM (Service Module)'s toilet facility (ASU), performing the monthly replacement of two urine receptacles (PR & MP) and a filter insert (F-V) with new spares. The old units were trashed.

Later, Yurchikhin and Kotov reviewed procedural material and prepared equipment

for the upcoming (9/19) removal & replacement of major Orlan/spacesuit support hardware in the DC1 (Docking Compartment) and SM PkhO (Transfer Compartment) with new units, consisting of the BSS-4 Orlan Interface Unit with BUS-MK control unit, oxygen line, Orlan hose bundles I & II, and Orlan emergency hoses.

Performing the periodic (generally monthly) service of the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), Yurchikhin removed the PCMCIA memory card #934 from the AST spectrometer's slot and copied the accumulated data for subsequent downlinking via OCA. Card 934 was then bagged for return to Earth and PCMCIA card 932 inserted to continue AST ops.

Oleg and Fyodor loaded final trash and excessed cargo on Progress M-60/25P, logging movements on the IMS (Inventory Management System).

In preparation for the undocking of 25P tomorrow evening (8:34pm EDT), the two Russian crewmembers then –

- Reported state of completion of 25P loading to TsUP-Moscow,
- Dismantled and removed the LKT local temperature sensor commutator/switch (TA251MB) of the BITS2-12 onboard telemetry system from 25P, along with its PZU-1M ROM (read-only memory) unit, stowing the avionics items on ISS for reuse in a future vehicle,
- Activated the cargo ship and tore down the ventilation air duct,
- Removed the threaded quick-disconnect (QD) screw clamps rigidizing the mating surfaces of the docking & internal transfer system (SSVP), for which the ground restricted thruster firings by the Russian segment (RS) in the time interval 11:45am–1:13pm,
- Closed the hatches between 25P and the transfer tunnel (PrK) to the SM after taking video of the mating surfaces/seals,
- Conducted the standard one-hour PrK-SU & SU-Progress vestibule leak check to verify hermeticity, and
- Downlinked the video imagery of the SM/Progress hatch interface.

In the US Segment (USOS), Oleg Kotov configured the A31p laptop normally used for the sophisticated SSRMS (Space Station Remote Manipulator System) trainer application "ROBoT" with a hard disk drive loaded with VSW (Video Streaming Workstation) software, to support testing of docking video activities. *[The laptop will henceforth serve as both ROBoT and VSW machine and remains connected to the new Ethernet/OpsLAN.]*

CDR Yurchikhin conducted the routine maintenance of the SOZh system

(Environment Control & Life Support System, ECLSS) in the SM.

Fyodor also updated/edited the standard daily IMS “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers worked out according to their regular daily physical exercise program (about half of which is used for setup & post-exercise personal hygiene), the FE-2 on the CEVIS cycle ergometer and RED resistive exerciser, the CDR and FE-1 both on the VELO cycle with bungee cord load trainer as part of their MBI-8/ Part 1 “Countermeasures” exercise (see above).

Later today, Clay will transfer the crewmembers’ exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary “time permitting” task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second task from the voluntary work list for Oleg was the regular status check on the long-term BIO-5 Rasteniya-1 (“Plants-1”) micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

As additional “get-ahead” activities, Fyodor’s and Oleg’s “job jar” added two long-term tasks, viz., (1) a running inventorying behind panels in the RS when other activities are being performed, and (2) photo/video imagery of “Life on the Station” scenes in the RS (e.g., sleep & post-sleep, behavior of water in zero-G, food preparation, RS interior architecture, cosmonauts at work controlling the station, housekeeping, clothing, medical exams, viewing videos for entertainment, etc.).

At ~9:35am EDT, Clay powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), to conduct, at 9:40am, a ham radio exchange with students at Mitchell Elementary School in Ann Arbor, Michigan. Questions to the crew were uplinked by ARISS (Amateur Radio on ISS) beforehand. *[Mitchell Elementary school is a NASA*

*Explorer School (NES), with science and math programs integrated units that are related to NASA projects. “Is it hard to be in space for so long?”; “How do you keep from floating around while sleeping?”; “Do you have a bedtime?”; “How do you keep yourself clean in space?”; “How do you communicate with your Russian crewmates?”; “What is the temperature in space?”]*

At ~10:30am, FE-2 Anderson led the crew in performing the traditional installation of a commemorative plaque for a recent Shuttle mission, today for STS-118/13A.1. The event was downlinked for PAO via TV/audio on S-band & Ku-band.

At ~11:15am, Anderson had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop).

At ~2:15pm, the FE-2 will be supporting a crew-choice TV interview with television station KHGI-TV in Kearney, Nebraska, and the Ashland, NE Gazette.

At ~6:40pm, Clay Anderson is also scheduled for a private crew-choice conference on S-band/audio.

*Conjunction Advisory:* Ground teams are working on improving predictions for an ISS conjunction with space debris tomorrow at ~1:21pm EDT (TOA/time of closest approach), with a currently predicted radial miss distance of ~140m and POC (probability of collision) of  $10^{-8}$ . Preparations are underway for a DAM (debris avoidance maneuver) with Russian thrusters, to take place at ~9:30am tomorrow morning but to be called off if found unnecessary later today. Russian plans for propellant transfer from Progress M-61/26P are being put on hold until then.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:06am EDT [= epoch]):

Mean altitude -- 339.3 km

Apogee height -- 345.7 km

Perigee height -- 332.9 km

Period -- 91.32 min.

Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0009538  
Solar Beta Angle -- 8.2 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in the last 24 hours -- 71 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 50534

**Significant Events Ahead** (*all dates Eastern and subject to change*):

09/18/07 -- Progress M-60/25P undocking (SM aft port) -- 8:34pm  
09/24/07 -- ISS reboost (dV=3.4 m/s; setting up for Soyuz launch & 10A rendezvous on FD3)  
09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port) – FRR: 9/24  
09/28/07 -- FGB solar arrays retraction  
10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 “Harmony”, racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 “Jules Verne” launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/16/07  
**Date:** Sunday, September 16, 2007 11:39:20 AM  
**Attachments:**

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### **ISS On-Orbit Status 09/16/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for the crew except for housekeeping and voluntary work. Ahead: Week 22 of Increment 15. Flight Control to Crew: "Congratulations on the successful transition of the US OpsLAN to the ISL!"*

CDR Fyodor Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including ASU toilet facilities systems/replaceables plus the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Fyodor also gathered weekly data on total operating time & "On" durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

In support of the activation of the CDRA (Carbon Dioxide Removal Assembly) by ground command at ~10:30am EDT, FE-2 Anderson connected the ITCS LTL QD (Internal Thermal Control System Low Temperature Loop Quick Disconnect) jumper for the required cooling. *[Earlier, the LTL temperature setpoint was lowered by the ground (to 9.4 degC).]*

As a final step for the Progress M-60/25P undocking on Tuesday (9/18), Yurchikhin and Kotov installed the StM Docking Mechanism (*Stykovochnovo mekhanizma*) between 25P and the SM aft port. *[This task had originally been scheduled for 9/14. The StM is the "classic" probe-and-cone type, consisting of an active docking assembly (ASA) with a probe (SSh), which fits into the cone (SK) on the passive docking assembly (PSA) for initial soft dock and subsequent retraction to hard dock. The ASA is mounted on the Progress' cargo module (GrO), while the PSA sits on the docking ports of the SM, FGB and DC1.]*

The crewmembers worked out according to their regular daily physical exercise program (about half of which is used for setup & post-exercise personal hygiene); on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2) and VELO cycle with bungee cord load trainer (CDR, FE-1).

Working from the Russian discretionary “time permitting” task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second task from the voluntary work list for Oleg was another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Sony DSR PD-150P camcorder to obtain imagery of color bloom and cloud pattern anomalies from SM window #7. *[Photo targets were the Indian Ocean along the track from offshore Mozambique over the Mozambique Channel to the Kerguelen underwater range area, and the Atlantic along the track from offshore Brazil to the “Roaring Forties” water area in the Western Winds Current.]*

A voluntary task on Yurchikhin’s discretionary job list for today was the periodic photography of the SKK Removable Cassette Container payload’s cassette #9 through the DC1 (Docking Compartment) EVA window, and cassette #2 through window 6 in the SM, at maximum magnification. *[The SKK containers on the outside of the station are holding various material samples for exposure to the space environment.]*

At ~1:25pm EDT, Clay Anderson was scheduled for a private crew-choice conference on S-band/audio.

*ISL Transition Update:* Final tasks required today for a fully functional JSL/ISL (Joint Station LAN/Integrated Station LAN) network include getting the BRI Smart Switch Router in the Russian Segment (RS) recovered and the RS SSCs (Station Support Computers) and SM Printer on line.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 7:51am EDT [= epoch]):*

Mean altitude -- 339.3 km

Apogee height -- 345.7 km

Perigee height -- 333.0 km

Period -- 91.32 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0009437

Solar Beta Angle -- 3.6 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 64 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50518

**Significant Events Ahead** *(all dates Eastern and subject to change):*

09/18/07 -- Progress M-60/25P undocking (SM aft port) -- 8:34pm

09/24/07 -- ISS reboost (dV=3.4 m/s; setting up for Soyuz launch & 10A rendezvous on FD3)

09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/14/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis/1E undocking

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)

02/06/08 -- Progress M-62/27P undocking

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
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09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
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04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/15/07  
**Date:** Saturday, September 15, 2007 9:04:47 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/15/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- off-duty day for CDR Yurchikhin, FE-1 Kotov and FE-2 Anderson except for housekeeping and voluntary work (plus ISL transition support).*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

Clay Anderson assisted ground specialists with the final transition of the old onboard OpsLAN (Operations Local Area Network), which uses coaxial cables, to the new ISL (Integrated Station LAN) system. Tasks requiring Clay's support included –

- Switching the OCA comm Router to ISL;
- Transitioning sufficient SSC (Station Support Computer) components to ISL to enable operations;
- Migrating the SSC-10 laptop to JSL (Joint Station LAN) and deploying it in the Airlock;
- Disconnecting coax drag-through cables and temporarily stowing the ends outside of the hatchway (all coax cables to be cleaned and stowed in the following weeks);
- Modifying the RSC-E "PingMaster" program, used for network checkouts, with the new IP addresses for JSL; and
- Displaying a quick-reference diagram showing port mapping near the ISL interface panel.

*[For troubleshooting an issue with powering up the WAP (Wireless Access Point), Clay was advised to try steps like checking connections at the WAP and ISL Interface Panel, power cycling WAP, and checking power cables. One SSC was temporarily left on coax to protect the option to configure via the old coax network. ISL is an upgraded onboard LAN utilizing Ethernet connectivity over the Router via cable or WAP. JSL is the designation for the overall network, including IP (International Partner) hardware and integration, while ISL refers to specifically US hardware. JSL/ISL integrates all ISS "user" devices, eventually including RS docking video distribution, payload comm & downlink (from IP modules, e.g., Columbus or Kibo), crew operations, procedures viewing, email, IP phone, etc. JSL/ISL eliminates drag-through cables in hatches, will be up to ten times faster than the current OpsLAN, and has provisions for future modules. Some installation tasks had been moved earlier to Increment 14.]*

At ~9:00am EDT, the crewmembers held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Fyodor Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The crewmembers worked out according to their regular daily physical exercise program (about half of which is used for setup & post-exercise personal hygiene); on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2) and VELO cycle with bungee cord load trainer (CDR, FE-1).

Afterwards the FE-1 copied the crew's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second task from the voluntary work list for Oleg was the regular status check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and

Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

Also on Oleg's "job jar" task list was the periodic use of the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

At ~6:30pm, Clay was scheduled for a private crew-choice conference on S-band/ audio.

*Solar Array Efficiency Testing:* MCC-H has started the periodic US Solar Array Efficiency Test, with no crew involvement or onboard powerdowns required. Beginning at 8:14pm EDT, solar arrays were shunted for the last 10 minutes of three successive insolation passes to measure the total current being produced by the photovoltaics. The SAWs remain in autotrack, but with the drag-reduction bias removed. *[Photovoltaic current (amperes) is measured with a shunt, i.e., a resistor of accurately-known resistance (ohms) placed in series so that all electricity to be measured flows through it. Because of Ohm's Law (Current = Voltage divided by Resistance), the current flowing can be calculated by measuring the voltage drop across the resistor.]*

*BSV-M A1 Failure:* After the recent work on the Russian BSV-M Frequency & Time Synchronization System in the SM, one of the two redundant units (BSV-M A1) remains failed. TsUP/Moscow specialists are investigating. *[BSV-M provides timing signals to the Vozdukh CO2 removal system when the latter is in Manual Mode, as currently the case.]*

### **Weekly Science Update** (*Expedition Fifteen -- 20<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Next and last session in Inc15 is for card exchange. This last session is scheduled on 9/17.

*ANITA:* Planned.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2:* Completed.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS):* Continuing,

*CFE (Capillary Flow Experiment):* Reserve.

*CHROMOSOME-2 (E14 SFP):* Completed.

*CSI-2/CGBA (CGBA Science Insert #2/Commercial Generic Bioprocessing Apparatus):* Images from CHab show good Yeast growth on Side 1. Images from Cell Culture Hab show good plant cell growth on Side 1 as well. The seeds in Plant Hab have not germinated yet after 14 days. Options for increasing moisture to the seeds are being tested on the ground units.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* Complete.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Next scheduled operation is 10/29-11/3.

*EMCH (Elastic Memory Composite Hinge):* Complete.

*EPO (Educational Payload Operation) Kit C:* Planned.

*IMMUNO (Saliva Sampling):* First session samples are currently stowed in MELFI Dewar #2.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* Since last report on 9/6, MULTIGEN-1 continues to be performed in EMCS (European Modular Cultivation System). Arabidopsis plants are growing in the various EC's (Experiment Containers), with the exception of ECs A3 & B3, where no germination has occurred yet. Before the Water Reservoir Exchange activity on 9/11, A3 and B3 were provided with more additional water than the other ECs, to improve the germination likelihood. From the initial set of plants, some have dried out but are now replaced by new ones. This staggered germination phase will have an impact on the circumnutation phase duration. On 9/13, 3D video recording of plants has started (for ECs A1 & B4).

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* "Clay, SAME wanted to let you

know how things have been going. We've been active every day since you completed the installation, and the testing has been going extremely well. We will have completed the first carousel (6 samples) by Friday morning, which included at least one of every sample type. The system has performed to the best of our expectations and we've had no trouble obtaining the data that we needed. It's still too soon to provide an analysis, but we have seen some results that we did not fully anticipate. Thanks for the great and speedy install. We're enjoying our ops and look forward to the next 4 sets of tests.”

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION:* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*SAMPLE:* Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* n/a

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* In progress.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Planned.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 9/11 the ground has received a total of 13,715 CEO images for review and cataloging for Increment 15. From the 723 frames of new imagery received this past week investigators have identified for prioritized review those images with camera times corresponding to the following CEO target request times: London, England; Tigris-Euphrates Delta; Aral Sea; GW Fire, Oregon; Cloud Plume, Texas; Kabul Afghanistan; and Mount Whitney, California. Kudos for excellent imagery of the Yellowstone National Park and Tigris-Euphrates Delta targets. Immediate imagery requirements for these sites have been met and they can be retired from the lists. “Kudos also for your striking view of the volcanic island of Simushir in the Kuril Archipelago northeast of Japan. It will be published on NASA/GSFC’s Earth Observatory website this week.”

Today’s CEO (Crew Earth Observation) photo targets were **Tropical Storm Ingrid,**

**Atlantic Ocean** (*Dynamic Event. ISS orbit track passed directly over the predicted position of Tropical Storm Ingrid. Photography of the system during approach, pass-over and moving away was requested to record the general cloud structure and surrounding atmospheric environment*), **Navassa Island reef, Caribbean** (*weather was predicted to be mostly clear over Navassa island for nadir photography of the island and its fringing reefs. The island is located south of Cuba, east of Jamaica, and west of Haiti. Repeat photography of the reefs is important for monitoring of changes to structure and color resulting from natural and anthropogenic ecosystem stresses. Looking slightly to the left of track for the island*), and **Iceberg A22A, South Atlantic** (*Dynamic Event. Observers are tracking the breakup of an iceberg [designated A22A] as part of IPY [International Polar Year] activities. Its orbit track brought ISS over the area that the iceberg remnants were predicted to be, based on satellite imagery. Significant cloud cover was also predicted to be present along the orbit track, but the crew was to look for gaps that may allow for views of ice on the sea surface below*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 9:03am EDT [= epoch]*):

Mean altitude -- 339.4 km  
Apogee height -- 345.8 km  
Perigee height -- 333.0 km  
Period -- 91.32 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0009486  
Solar Beta Angle -- -0.9 deg (magnitude bottoming out)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in the last 24 hours -- 44 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 50503

**Significant Events Ahead** (*all dates Eastern and subject to change*):

09/18/07 -- Progress M-60/25P undocking (SM aft port) -- 8:34pm  
09/24/07 -- ISS reboost (dV=3.4 m/s; setting up for Soyuz launch & 10A rendezvous on FD3)  
09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
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04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
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07/29/08 -- ATV-1 undocking (from SM aft port)  
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09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC

10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
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10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/14/07  
**Date:** Friday, September 14, 2007 12:48:21 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/14/07**

All ISS systems continue to function nominally, except those noted previously or below.

After recently (9/11) testing the new external OpsLAN/Ethernet connection between Node and the BRI Smart Switch Router in the SM (Service Module), FE-1 Kotov today replaced software (i.e., the net configuration file) in the BRI, first loading it into the RSS1 laptop, then installing it from there on BRI. Afterwards, the network was tested again with the RSC-Energia "PingMaster" application.

As part of the regular monthly preventive maintenance of RS (Russian Segment) ventilation systems, CDR Yurchikhin spent time in the FGB (*Funktsionalnyi-Grusovoi Blok*), cleaning up and servicing the detachable VT7 fan screen guards (grilles) of the TCS/SOTR (Thermal Control System)'s gas-liquid heat exchangers (GZhT4).

Kotov and Yurchikhin had another ~3 hrs scheduled between them for finishing up stowing discarded equipment and trash in the Progress M-60/25P cargo ship-turned-trash container, keeping track of the movements in the IMS (Inventory Management System).

Afterwards, in preparation of next week's (9/18) undocking of 25P, the FE-1 unbolted and removed the cargo ship's US-21 matching unit in its container box, stowed it and recorded the stowage location in the IMS. *[The BITS 2-12 onboard telemetry measurement system and VD-SU monitoring mode, turned off for the activity, were later reactivated. The US-21, with its associated commutator gear, provides the electronic interface between the SM and the Progress for SM computer control of Progress propulsion. When a Progress is undocked and jettisoned, the valuable electronics are retained in storage, to be recycled on a future vehicle.]*

As next preparatory step for the undocking, the two Russian crewmembers installed the StM Docking Mechanism (*Stykovochnovo mekhanizma*) between 25P and the SM aft port. *[The StM is the "classic" probe-and-cone type, consisting of an active docking assembly (ASA) with a probe (SSh), which fits into the cone (SK) on the passive docking assembly (PSA) for initial soft dock and subsequent retraction to hard dock. The ASA is mounted on the Progress' cargo module (GrO), while the PSA sits on the docking ports of the SM, FGB and DC1.]*

Third day of onboard network transition: FE-2 Anderson printed out instructional material for the ongoing upgrading of the OpsLAN network architecture of the ISS to JSL/ISL (Joint Station LAN/Integrated Station LAN), then had about 3 hrs for final ISL and EWIS (External Wireless Instrumentation System) hardware installations and completion of cable connections. *[Since the ISL Router power cable was found to be only one-fault tolerant instead of the required two-fault tolerance, Clay resolved the issue by installing a bonding strap on the Router, grounding it directly to the ISS rack structure (the power source itself being grounded with a double-redundant cable). ISL is an upgraded on-board LAN (Local Area Network) utilizing Ethernet connectivity over the Router via cable or WAP (Wireless Access Point). JSL is the designation for the overall network, including IP (International Partner) hardware and integration, while ISL refers to specifically US hardware. JSL/ISL integrates all ISS "user" devices, eventually including RS docking video distribution, payload comm & downlink (from IP modules, e.g., Columbus or Kibo), crew operations, procedures viewing, email, IP phone, etc. JSL/ISL eliminates drag-through cables in hatches, will be up to ten times faster than the current OpsLAN, and has provisions for future modules. Some installation tasks had been moved earlier to Increment 14.]*

Later today (~1:30pm EDT), Clay Anderson will tag up with Flight Controllers in Houston to discuss tomorrow's transition to the new OpsLAN architecture. *[The migration will proceed in priority order of OCA, SSC (Station Support Computer) Client in the SM, File Server, SSC Client in the Lab, and printer. The remaining OpsLAN devices will follow. At this time, payloads are not ready yet to utilize the new network, requiring Clay to pre-position two connectors of the main ISL cable at the base of AV-3 (Avionics Rack 3, LAB1D2).]*

Afterwards, the FE-2 will load JSL/ISL OCA Router software on the backup hard drive (#6070) of a 760XD SSC, then swap #6070 with #5007.

The FE-1 also performed troubleshooting on the Lab RWS PCS (Robotic Workstation/Portable Computer System) laptop, a ThinkPad A31p that failed yesterday. Two PCS machines remained operating, one in the SM, the other at the Cupola RWS. *[Today, Clay swapped the Cupola and Lab PCS HDDs (hard disk drives) with each other to verify that all hardware is functioning at the Lab PCS]*

*location. The Cupola A31p, now with the corrupted HDD, was then powered down for future restoration (re-ghosting).]*

Afterwards, Oleg continued the crew support of the MELFI (Minus-Eighty Laboratory Freezer for ISS) facility for POC (Payload Operations Center) by inserting two more Icepac belts into a MELFI dewar (Dewar 2/Tray C), as Clay Anderson did yesterday. *[Icepacs are used as thermal mass to keep samples cold during return and during extended MELFI power downs (e.g. during Soyuz Relocate). No more than two ambient Icepacs may be inserted at any given time into a Dewar that has samples in it, to protect the samples from warm-up.]*

Clay unstowed and set up the hardware for the flight experiment ANITA (Analyzing Interferometer for Ambient Air), an ESA-developed technology demonstrator for monitoring the quality of the air inside manned space vehicles. *[Background: The air quality of any crewed spacecraft needs to be continuously monitored in order to safeguard crew health. The astronauts have to respond rapidly to any accidental release of harmful gaseous contaminants or degradation of the ECLSS (Environmental Control & Life Support System). Air quality monitoring grows in importance as mission duration increases. ANITA is designed to monitor the cabin air for contaminants at concentrations down to the low ppm's (parts per million) or high ppb's (parts per billion) with high precision. Its fast measurement cycle allows the trend in air quality to be analyzed in near real-time, simultaneously identifying and quantifying 32 gaseous air contaminants. The experiment should demonstrate that ANITA FTIR (Fourier Transform Infrared) interferometer trace gas monitoring is effective in a real space environment, including the maintenance of calibration models from the ground, and thereby prove that modified commercial-off-the-shelf hardware provides a sound basis for ANITA.]*

A late-added 45-min. task for Anderson today dealt with the overcurrent trip of RPC-3 (Remote Power Controller 3) in RPCM (RPC Module) LA2A3B late on 9/11. For troubleshooting the event, Clay investigated the affected powerless UOP-3 (Utility Outlet Panel 3), first inspecting the equipment connected to it, then looking for the source of the trip by selective isolation of equipment, i.e., a process of elimination.

Afterwards the FE-2 was scheduled to work on the OGS (Oxygen Generation System), safing a Secondary Power connection by installing divider hardware at a cable/jumper connector interface, with the OGS rack temporarily powered down by ground commanding.

CDR Yurchikhin changed out the tape on the VDS VTR-2 (Video Distribution System/Video Tape Recorder 2) containing the data of the recent FPMU/PCU (Floating Potential Measurement Unit/Plasma Contactor Unit) activity (~9/11) for return to the ground. *[ISS FPMU data is critical for FPMU verification and*

*calibration, an important backup to the external PCUs to gage EVA hazard.]*

Continuing the extended leak checking of the spare BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator, Oleg charged the unit once again with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#23). The last test pressurization was done by Yurchikhin on 8/16. *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

After the recent work on the BSV-M Frequency & Time Synchronization System, whose temporary deactivation required setting the Russian Vozdukh carbon dioxide removal assembly on automatic Mode 1, the FE-1 today switched the CO<sub>2</sub> scrubber back to the standard manual Mode 5.

Kotov performed the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries are to be replaced if necessary. *[Purpose of the 10-min. activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements. Two CSA-CP (CSA-Combustion Products) instruments recorded O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post (#1060, prime) and in the Node (#1057, backup), while the CSA-O<sub>2</sub> units (#1063, #1042) looked for O<sub>2</sub> in the Lab and the CDMK (#1008) for CO<sub>2</sub> in SM and Lab. Also recorded were battery ticks. The instruments were turned off afterwards, except for the prime CSA-CP #1060 unit, and returned to their regular locations.]*

Oleg also updated/edited the standard daily IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Fyodor conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The crewmembers worked out according to their regular daily physical exercise program (about half of which is used for setup & post-exercise personal hygiene); on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2) and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later in the afternoon, the FE-1 copies the crew's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:15am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~4:40am, Fyodor and Oleg linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing stowage issues and equipment locations.

At ~9:55am EDT, Clay Anderson had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop).

At ~2:45pm, Clay will power up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), to conduct, at 2:50pm a ham radio exchange with students at Westbrook Intermediate School, Clear Creek, TX. Questions to the crew were uplinked by ARISS (Amateur Radio on ISS) beforehand. [*“What aspects of life are different in space?”; “After a Shuttle launch, the fuel tank and solid rocket boosters fall from space. What happens to them?”; “How does your body “act” in space? Example: Do you need haircuts?”; “Does seeing space from the scientific point of view spoil the “mystery” of space?”; “There are rumors that a meteor could hit earth in a few years. Is there a possibility that a meteor or space debris could hit ISS?”; “What question are you asked the most?”*]

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio will be conducted at ~4:00pm.

Working from the Russian discretionary “time permitting” task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). [*This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.*]

*Propellant Transfer Update:* Tonight, TsUP/Moscow will conduct propellant line purging/venting of the prop transfer lines between Progress 25P and the SM. Before, Clay Anderson will verify closure of the protective Lab science window shutter (which can be opened again around midnight).

*SSRMS Activities:* CSA/Robotics specialists continue to work with the SSRMS (Space Station Remote Manipulator System), gathering engineering data from the robotarm's wrist joint FMS (Force Moment Sensors). When finished, the SSRMS will be returned to the current park position.

*Solar Array Drag Reduction:* As previewed here on 9/6, the "night glider" BGA (Beta Gimbal Assembly) dual-angle bias setting in sun-pointing autotrack mode was initiated late on 9/11 and is currently maintained whenever possible and permitted by altitude management. *[In this mode, the U.S. SAWs (Solar Array Wings) are offset (biased) toward the orbit plane, currently by 37 deg (the maximum Flight Rule-allowed amount) to decrease the surface area facing in flight direction (i.e., velocity vector) and thus the atmospheric drag. The benefit is potential prop savings of 50-60 kg of ISS propellant prior to 10A launch and on the order of two Progress flights per year, which should enable NASA to meet our balance of contributions commitment for 30% drag reduction overall. Flying with this configuration will also increase the expected number of consecutive launch attempts for 10A with FD3 docking from 11 to 15 days, as well as improve reboost planning by providing about a week to assess the drag reduction performance prior to designing the 9/24 reboost.]*

*Prelim. Timeline of Progress 25P Undocking from SM Aft Port:*

Tuesday, 9/18 (EDT):

6:40pm: USOS to RS Attitude Control Handover

8:33pm: ISS to Free Drift

8:34pm: 25P Undock Command

8:37pm: Physical Separation (dV~0.12 m/s)

8:40pm: 25P Separation Burn #1 (dV~0.62 m/s)

8:42pm: ISS maneuvers to LVLH Attitude

9:20pm: RS to USOS Attitude Control Handover.

Today's CEO (Crew Earth Observation) photo targets were **Arkenu 1 and 2 Impact Craters, Africa** (ISS had a nadir pass over this pair of impact craters, formed at approximately the same time by the same impact event. The circular features stand out from the surrounding desert and are located due west of two much larger, easily visible circular features; a sequence of overlapping nadir frames acquired along-track should capture the craters), **Tropical Depression 8, Atlantic Ocean** (Dynamic Event. Looking to the left of track as the station approached Puerto Rico for what is predicted to become Tropical Storm Ingrid. This compact weather system may exhibit good circulation features [cloud bands] by the time of ISS overflight), **South American Fires** (Dynamic Event. Biomass burning is occurring over much of eastern South America, and the crew had an opportunity to photograph smoke plumes and their sources. Looking to the right of track as they

*crossed the Amazon River delta and begin to traverse Brazil for smoke plumes), and **Upheaval Dome Impact Crater, Utah** (this impact structure presents a classical "bull's eye" appearance from above, caused by the horizontal sedimentary layers exposed by the crater. ISS had a nadir pass over the Canyonlands of southern Utah; overlapping frames acquired along-track should capture the impact structure).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:31am EDT [= epoch]*):

Mean altitude -- 339.5 km

Apogee height -- 345.7 km

Perigee height -- 333.2 km

Period -- 91.32 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0009329

Solar Beta Angle -- -5.4 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 62 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50487

Significant Events Ahead (*all dates Eastern and subject to change*):

09/15/07 -- U.S. Solar Array Efficiency Test

09/18/07 -- Progress M-60/25P undocking (SM aft port) -- 8:34pm

09/24/07 -- ISS reboost (dV=3.4 m/s; setting up for Soyuz launch & 10A rendezvous on FD3)

09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/14/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/13/07  
**Date:** Thursday, September 13, 2007 2:50:44 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/13/07**

All ISS systems continue to function nominally, except those noted previously or below.

Working two hours in the DC1 (Docking Compartment), FE-1 Kotov performed FDS (Fire Detection System) maintenance by dismantling two of the three IDZ-2 smoke detectors (skipping #2), cleaning their ionizing needles and then reinstalling the sensors.

After yesterday's ground-controlled test of the two BSV-M Frequency & Time Synchronization Unit (i.e., master clock) boxes A1 & A2 in the SM (Service Module), CDR Yurchikhin changed their cable connections back to the initial configuration, supported by ground specialist tagup.

FE-2 Anderson had two hours reserved for conducting the periodic inspection of the ELPS (Emergency Lighting Power Supply) units in the U.S. segment. After the inspection, Anderson installed a fastener missing from a handrail seat track on an associated Node closeout panel. *[There are three ELPS units in the Node, two in the Lab, and one ELPS in the US Airlock.]*

The FE-2 also performed Part 5 (of 5) of the periodic acoustic measurement protocol conducted during the past two days, by recording final data of the static dosimeters in the station, then stowing the hardware. *[EHS (Environmental Health System) Acoustic Dosimeter data must be taken twice per Increment, each time for the duration of the 16-hour crew workday.]*

Afterwards, Anderson had three hours allotted to complete work with the installation procedures for the new ISL (Integrated Station LAN) network, involving stringing cables, making all Router connections and concluding with the installation of the internal antenna of the EWIS (External Wireless Instrumentation System). On Saturday (9/15), the long-awaited OpsLAN transition will be performed from the

ground. *[At completion today, the Lab ISL should be fully connected to the Node, Airlock and the Russian Segment (RS). ISL is an upgraded on-board LAN utilizing Ethernet connectivity over the Router via cable or wireless (WAP/Wireless Access Point). ISL integrates all ISS "user" devices, eventually including RS docking video distribution, payload comm & downlink (from IP modules, e.g., Columbus or Kibo), crew operations, procedures viewing, email, IP phone, etc. ISL eliminates drag-through cables in hatches, will be up to ten times faster than the current OpsLAN, and has provisions for future modules. Some installation tasks had been moved earlier to Increment 14, and although transition is scheduled for this weekend, payloads are not ready yet to utilize the new network, requiring Clay to pre-position two connectors of the main ISL cable at the base of AV-3 (Avionics Rack 3, LAB1D2).]*

In the Soyuz TMA-10/14S spacecraft, docked at the FGB nadir port, Yurchikhin turned off the spacecraft's gas analyzer (GA) which was activated on 9/10, a periodic procedure to monitor the atmosphere of the CRV (Crew Return Vehicle).

Fyodor and Oleg had another ~6 hrs allotted between them for finishing up stowing discarded equipment and trash in the Progress M-60/25P cargo ship-turned-trash container, keeping track of the movements in the IMS (Inventory Management System).

The CDR worked on updating/editing the standard daily IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Afterwards, Yurchikhin also performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Continuing his support of the MELFI (Minus-Eighty Laboratory Freezer for ISS) facility for POC (Payload Operations Center), Clay inserted two more Icepac belts into a MELFI dewar (Dewar 1/Tray B). *[Icepacs are used as thermal mass to keep samples cold during return and during extended MELFI power downs (e.g. during Soyuz Relocate). No more than two ambient Icepacs may be inserted at any given time into a Dewar that has samples in it, to protect the samples from warm-up.]*

Kotov conducted the weekly 10-min. CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water callowns are sent up every other week (currently: #15-0027X). The update records any changes in CWC status over the last few days and provides the data to MCC-Houston.]*

Working from the Russian discretionary “time permitting” task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second task from the voluntary work list for Oleg was the regular status check on the long-term BIO-5 Rasteniya-1 (“Plants-1”) micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

The crewmembers worked out according to their regular daily physical exercise program (about half of which is used for setup & post-exercise personal hygiene); on the CEVIS cycle ergometer (FE-1), TVIS treadmill (CDR, FE-2), RED resistive exerciser (FE-1, FE-2) and VELO cycle with bungee cord load trainer (CDR).

Later in the afternoon, the FE-2 copies the crew’s exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*Propellant Transfer Update:* TsUP/Moscow was scheduled today to perform transfer of fuel (UDMH, unsymmetrical dimethyl hydrazine) from the Progress M-61/26P cargo ship’s BG1,2 refueling tanks to the SM’s BG2 tank, while pumping out N<sub>2</sub> using the K1 compressor. No crew action was required. *[M-60/25P prop line purge/vent is scheduled tomorrow.]*

*SSRMS Activities:* Today and tomorrow CSA/Robotics specialists on the ground are busy reconfiguring SSRMS (Space Station Remote Manipulator System) wrist joints in order to gather engineering data from the FMS (Force Moment Sensor). When finished, the SSRMS will be returned to the current park position.

*Solar Array Drag Reduction:* As previewed here on 9/6, the “night glider” BGA (Beta Gimbal Assembly) dual-angle bias setting in sun-pointing autotrack mode was initiated late on 9/11 and is currently maintained whenever possible and permitted by altitude management. *[In this mode, the U.S. SAWs (Solar Array Wings) are offset (biased) toward the orbit plane, currently by 37 deg (the maximum Flight Rule-allowed amount) to decrease the surface area facing in flight direction (i.e., velocity vector) and thus the atmospheric drag. The benefit is potential prop savings of 50-*

*60 kg of ISS propellant prior to 10A launch and on the order of two Progress flights per year, which should enable NASA to meet our balance of contributions commitment for 30% drag reduction overall. Flying with this configuration will also increase the expected number of consecutive launch attempts for 10A with FD3 docking from 11 to 15 days, as well as improve reboost planning by providing about a week to assess the drag reduction performance prior to designing the 9/24 reboost.]*

*Prelim. Timeline of Progress 25P Undocking from SM Aft Port:*

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*6:40pm: USOS to RS Attitude Control Handover*

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*8:37pm: Physical Separation (dV~0.12 m/s)*

*8:40pm: 25P Separation Burn #1 (dV~0.62 m/s)*

*8:42pm: ISS maneuvers to LVLH Attitude*

*9:20pm: RS to USOS Attitude Control Handover.*

Today's CEO (Crew Earth Observation) photo targets were **Afar Rift Zone, Ethiopia** (*looking to the right of track as ISS approached the "elbow" formed by the Red Sea and Gulf of Aden - the area to the west of the elbow is the Afar Rift Zone [also known as the Afar Triangle]. This geologically active region is a junction between the Arabian, Indian, and African tectonic plates - all of which are moving away from each other, producing frequent earthquakes and historically active volcanoes [such as Erta Ale in Ethiopia]. Overlapping frames of the Afar Triangle area will provide a useful record of the rift area, particularly surface expressions of faults and lava flows*), and **Shortgrass Steppe, Colorado** (*this LTER [Long Term Ecological Research] site is located in the western Great Plains near the front ranges of the Rocky Mountains. Land uses in the site area are varied, ranging from active grazing parcels to federally protected lands - leading to a dynamic range of ecosystem processes. Overlapping nadir frames, acquired along-track, were requested in order to document vegetation and land use patterns in the site area*).

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<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:15am EDT [= epoch]*):

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Perigee height -- 333.4 km  
Period -- 91.32 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0009066  
Solar Beta Angle -- -9.9 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in the last 24 hours -- 62 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 50471

**Significant Events Ahead** (*all dates Eastern and subject to change*):

09/13/07 -- Progress M-61/26P prop transfer (fuel) to ISS  
09/14/07 -- Progress M-60/25P prop line purge/vent  
09/18/07 -- Progress M-60/25P undocking (SM aft port) -- 8:34pm  
09/24/07 -- ISS reboost (dV=3.4 m/s; setting up for Soyuz launch & 10A rendezvous on FD3)  
09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
**new date**  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab **new date**  
11/14/07 -- US EVA-10 **new date**  
11/18/07 -- US EVA-11 **new date**  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking

02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation’s Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/12/07  
**Date:** Wednesday, September 12, 2007 1:52:21 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/12/07**

All ISS systems continue to function nominally, except those noted previously or below.

Right after wake-up FE-2 Anderson started Part 3 (of 5) of the periodic acoustic measurement protocol by recording post-sleep data of the crew-worn acoustic dosimeters, later deploying the dosimeters statically in the station for the duration of the day, then recording measurements this afternoon (~3:10pm EDT) and stowing the instruments. *[Acoustic data must be taken twice per Increment, each time for the duration of the 16-hour crew workday.]*

Afterwards, Anderson began a major three-day outfitting activity, totaling about 10 hrs, to complete hardware installations for the new ISL (Integrated Station LAN) network, with the long-awaited OpsLAN transition to be performed by the ground next Saturday (9/15). *[After powering up the SVG (Space Video Gateway) for its subsequent updating by the ground for the transition, the FE-2 went to work replacing the existing Router mount with new mounting hardware, swapped an AV-2 (Avionics Rack 2, LAB1D1) closeout panel with a new one, and installed the majority of new EWIS (External Wireless Instrumentation System) internal components (i.e., NCU/Network Control Unit & its base plate). Tomorrow and on Friday, Clay's work will involve completion of cable stringing plus making all Router connections. At completion, the Lab ISL should be fully connected to the Node, Airlock and the Russian Segment (RS). ISL is an upgraded on-board LAN utilizing Ethernet connectivity over the Router via cable or wireless (WAP/Wireless Access Point). ISL integrates all ISS "user" devices, eventually including RS docking video distribution, payload comm & downlink (from IP modules, e.g., Columbus or Kibo), crew operations, procedures viewing, email, IP phone, etc. ISL eliminates drag-through cables in hatches, will be up to ten times faster than the current OpsLAN, and has provisions for future modules. Some installation tasks had been moved earlier to Increment 14, and although transition is scheduled for this weekend, payloads are not ready yet to utilize the new network, requiring Clay to pre-position*

*two connectors of the main ISL cable at the base of AV-3 (Avionics Rack 3, LAB1D2).]*

After switching the COA (Atmosphere Purification System) Vozdukh CO<sub>2</sub> scrubber to autonomous (automatic cycle control) mode, CDR Yurchikhin worked on the two BSV-M Frequency & Time Synchronization Unit (i.e., master clock) boxes A1 & A2, changing cable connections for a ground controlled test. The initial cable configuration will be restored tomorrow.

FE-1 Kotov meanwhile performed scheduled IFM (in-flight maintenance) on the SM (Service Module)'s condensate water processor (SRV-K2M) by removing and replacing its water-conditioning unit purification columns (BK BKV). The old unit was disposed of in Progress 25P. *[The SRV-K2M converts collected condensate into drinking water and dispenses the reclaimed water (warm and hot) for drinking and preparation of food and beverages.]*

Oleg Kotov also completed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water collected in CWC (Contingency Water Container) #1051 from the Lab CCAA (Common Cabin Air Assembly) dehumidifier. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

The CDR collected the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

After Flight Controllers deactivated the CDRA (Carbon Dioxide Removal Assembly) early this morning (3:00-8:00am EDT), and cooling was no longer required, Yurchikhin demated and took down the ITCS LTL QD (Internal Thermal Control System/Low Temperature Loop/Quick Disconnect) jumper.

The Russian crewmembers had 6 hrs allotted between the two of them for finishing up stowage of discarded equipment and trash in the Progress 25P cargo ship-turned-trash container, keeping track of the movements in the IMS (Inventory Management System).

In the U.S. Airlock, Clay Anderson supported the current periodic (50-day) maintenance/reconditioning cycle of U.S. EMU (Extravehicular Mobility Unit) batteries by terminating discharge on the final battery set (#2077, #2038) in the

BSA (Battery Stowage Assembly). *[Afterwards, the A31p SSC with its commercial DOS application for automated control of the process was reconfigured to its nominal settings.]*

Oleg also performed the periodic data collection and downlink on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse.

Clay conducted the periodic status checkup & filter inspection of the running CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to Earth.]*

Working from the Russian discretionary "time permitting" task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

Kotov performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the periodic checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

Anderson conducted the periodic (every two weeks) inspection of the RED (Resistive Exercise Device) with canister cords and accessory straps as well as the canister bolts for re-tightening if required.

The crewmembers worked out according to their regular daily physical exercise program (about half of which is used for setup & post-exercise personal hygiene); on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO cycle with bungee cord load trainer (FE-1).

Later in the afternoon, the FE-2 will download the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~9:05am EDT, the crew held a teleconference via Ku- & S-band with members of the next ISS crew, Expedition 16. *[These exchanges have the purpose to begin the handover process prior to the arrival on orbit of the next crew, through videocons and data exchanges between the current crew and the upcoming crew. Starting in October, Expedition 16 will involve Commander Peggy A. Whitson, Flight*

*Engineers Yuri Malenchenko, Daniel M. Tani, Léopold Eyharts and Garrett E. Reisman, plus Malaysian SFP (Spaceflight Participant) Sheikh Muszaphar Shukor.]*

At ~10:55am, Clay powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), to conduct, at 11:00am a ham radio exchange with students at King Academy (formerly Alexander Macomb Academy), Mount Clemens, Michigan. Questions to the crew were uplinked by ARISS (Amateur Radio on ISS) beforehand. *[Mt. Clemens, Michigan, is located NE of Detroit and is the county seat of Macomb County. Originally settled in 1818, Mt. Clemens was widely known in the early 20<sup>th</sup> century for its pungent and therapeutic mineral baths. King Academy of Year-Round Education is one of three elementary schools under the jurisdiction of Mount Clemens Community Schools. "How do you eat? Does the food fly around?"; "Have you seen any different creatures in space?"; "How do you write to a friend?"; "How do you wash up?"; "Do you have a hard time putting on your clothes in space?"; "How do you stay mentally healthy?"]*

*Propellant Transfer Update: TsUP/Moscow was scheduled today to perform transfer of oxidizer (N<sub>2</sub>O<sub>4</sub>, nitrogen tetroxide) from the Progress M-61/26P cargo ship's BG1,2 refueling tanks to the SM's BO2 tank, and to pump out N<sub>2</sub> using the K2 compressor. No crew action was required. [Transfer of fuel (UDMH, unsymmetrical dimethyl hydrazine) from 26P is scheduled for tomorrow, followed by M-60/25P prop line purge/vent on Friday.]*

*Prelim. Timeline of Progress 25P Undocking from SM Aft Port:*

*Tuesday, 9/18 (EDT):*

*6:40pm: USOS to RS Attitude Control Handover*

*8:33pm: ISS to Free Drift*

*8:34pm: 25P Undock Command*

*8:37pm: Physical Separation (dV~0.12 m/s)*

*8:40pm: 25P Separation Burn #1 (dV~0.62 m/s)*

*8:42pm: ISS maneuvers to LVLH Attitude*

*9:20pm: RS to USOS Attitude Control Handover.*

Today's CEO (Crew Earth Observation) photo targets were **S. Mozambique, Africa** (*detailed imagery along-track was requested to document the current ecosystem conditions in the region. Southern Mozambique is an active petroleum exploration/development target, and rapid urbanization is expected to occur in the region following petroleum industry infrastructure. ISS CEO imagery will allow for time-series comparison of changes to the landscape as development occurs*), **Milk River, Montana** (*this river was named by Meriwether Lewis during the famous Lewis and Clark Expedition due to its milky appearance - caused by a high*

*proportion of silty sediment in the water. ISS orbit track took the crew directly over the river; they were asked to look for the Bear Paw Mountains and Missouri River to the SW and S respectively as they approached the target area from the NW. Overlapping frames were requested along-track in order to build an image mosaic of this historic site), **Luquillo Forest, Puerto Rico** (weather was predicted to be mostly clear over NE Puerto Rico, the location of the Luquillo National Forest. The Forest is also the location of a Long Term Ecological Research [LTER] site. Overlapping nadir frames, taken along-track, were requested to document vegetation extent and shoreline morphology. The crew was to start image acquisition as ISS approached the NE tip of the island from the NW), and **Andrews Forest, Washington** (the Andrews Forest LTER site investigates forest stand dynamics due to both logging activities and fires – the major valley/agricultural fields of western Oregon, and three major Cascade Range volcanoes are good visual cues for the site area. Overlapping nadir frames, acquired along-track, were requested to map current canopy extent and vegetation regrowth patterns. Starting photography after ISS crossed the agricultural fields to the west, as soon as it passed over the crest of the Cascades).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:57am EDT [= epoch]*):

Mean altitude -- 339.6 km

Apogee height -- 345.5 km

Perigee height -- 333.7 km

Period -- 91.33 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0008755

Solar Beta Angle -- -14.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 75 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50455

Significant Events Ahead (*all dates Eastern and subject to change*):

09/13/07 -- Progress M-61/26P prop transfer (fuel) to ISS

09/14/07 -- Progress M-60/25P prop line purge/vent

09/18/07 -- Progress M-60/25P undocking (SM aft port) -- 8:34pm

09/24/07 -- ISS reboost (dV=3.4 m/s; setting up for Soyuz launch & 10A rendezvous)

on FD3)

09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/04/07 -- **50 Years of Spaceflight (Sputnik 1)**  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/05/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/07/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/13/07 -- US EVA-10  
11/19/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- ATV-1 docking (SM aft port)  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch

08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/11/07  
**Date:** Tuesday, September 11, 2007 1:21:15 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/11/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, FE-2 Anderson began Part 1 (of 5) of the periodic acoustic measurement protocol by deploying crew-worn acoustic dosimeters, to be carried for 24 hours (with a microphone on the shirt collar). (Last time done: 6/28). *[Tonight, after about 15 hours of measurements, dosimeter data will be downloaded and the hardware power-cycled for another data take starting tonight after 8.5-hr. sleep. At that point, the crew will deploy the dosimeters statically in the station for the duration of the day, record measurements tomorrow noon and stow the instruments. Acoustic data must be taken twice per Increment, each time for the duration of the 16-hour crew workday.]*

CDR Yurchikhin and FE-1 Kotov had an hour reserved for removing and replacing 11 SD-17 power supplies for lighting units in the RS (Russian Segment). *[The R&Rs involved 5 lights in the SM and 6 lights in the FGB. The new spares were delivered on Progress M-59/24P this year and M-57/22P in 2006.]*

As part of the recent SUBA (Onboard Equipment Control System) outfitting in the SM (Service Module), Oleg Kotov made additional cable connections and used the "Elektronika" MMTs01 Multimeter for final connectivity testing of the newly installed PPS-31 System Power Panel and BSKN-25 Load Power Switching Unit, both required to support the installation of additional power outlets in the RS.

Afterwards, Kotov supported the ground in reactivating the Elektron oxygen generator, which had to be turned off for the preceding SUBA outfitting because it required temporary disconnection of the BITS2-12 Onboard Telemetry Measurement System and VD-SU control mode. *[Reactivation was at 32 amps, and as usual Oleg monitored the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no*

*overheating. During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

After yesterday's PCSR10U OBT (Onboard Training) session, Clay Anderson transitioned PCS (Portable Computer System) A31p laptops to new PCSR10U software. *[Starting with the Cupola RWS (Robotic Workstation) and A/L (Airlock) laptops, the FE-2 swapped the PCS HDDs (Hard Disk Drives) with new plug-in drives containing the software; he also replaced the main batteries of the laptops with fresh ones. After verifying good connections to the C&C MDM (Command & Control Multiplexer/Demultiplexer), Clay then upgraded the other two PCS A31p machines (Lab & SM). The CUP and A/L PCSs were later powered down, and the ground will be loading software to the Node MDMs to complete the transition. The main change for the PCS R10U version is the addition of a CCS (Command & Control System) Restart Domain, used via the Node MDMs in the event that the legacy "Mighty Mouse" application, a special resident last-resort/fail-safe software package for recovering after C&C MDM failure, has failed to do so.]*

To reflect the computer changes in the SODF (Station Operation Data File) Caution & Warning procedures, the FE-2 replaced relevant pages in the POC (Portable Onboard Computer) book, trashed the old pages and restowed the book.

In the A/L, Anderson supported the current periodic (50-day) maintenance/reconditioning cycle of U.S. EMU (Extravehicular Mobility Unit) batteries, terminating discharge on batteries #2063 & #2041 in the BSA (Battery Stowage Assembly) and initiating it on batteries #2077 & #2038. *[Afterwards, the A31p SSC with its commercial DOS application for automated control of the process was to be returned to nominal configuration.]*

Last day of the two-week testing of the Russian ASN-M Satellite Navigation Equipment by TsUP-Moscow, supported onboard by CDR Yurchikhin. *[After a final transfer of accumulated raw data from the ASN application on Laptop 3 (LT3) to a 128MB flash card for subsequent downlinking via OCA/S-band for ground processing, Fyodor disassembled the hardware and stowed it along with LT3. ASN-M will be required for proximity operations and docking of the European ATV-1 (Automated Transfer Vehicle 1) "Jules Verne" to the SM aft end, currently planned for 2/14/08. The ground-controlled testing simulated the ATV rendezvous phase using the ASN system, and its results are being used to assess the ASN-M equipment's readiness for joint ATV operations.]*

The FE-2 serviced the MULTIGEN experiment (Molecular & Plant Physiological Analyses of the Microgravity Effects on Multigenerations of *Arabidopsis thaliana*),

installed in the EMCS (European Modular Cultivation System), by first switching off the ER3 (EXPRESS Rack 3), then replacing the EMCS water reservoir in order to supply the plants with sufficient water for the upcoming months, and afterwards switching ER3 on again. *[MULTIGEN was activated on 8/25. This ESA experiment evaluates the morphology of A. thaliana over three generations. The plants growing in EMCS right now are the First Generation of A. thaliana to be grown on ISS. A. thaliana, commonly known as Thale Cress, is a model organism to study genetic morphological events since its genome has been mapped and is widely used in genetic and molecular research. MULTIGEN studies the morphological and genetic effects of microgravity on plants, which will be grown to maturity (7-8 weeks) and then dried and stored for return to Earth. Some of the seeds that are returned will be used in ground studies and others will be returned to ISS for the Second Generation of growth. The Second Generation's seeds will be analyzed genetically and also used for a Third Generation of plants on ISS. Ultimately, the data collected from this multigenerational experiment could be applied to future agriculture endeavors for long-duration space flight.]*

Yurchikhin and Kotov had another two hours set aside for stowing discarded equipment on Progress 25P for disposal, keeping track of the movements in the IMS (Inventory Management System). In addition, Anderson had 1.5 hrs allotted for gathering U.S. trash for disposing on the cargo ship-turned-trash can. *[25P will be undocked next week, 9/18.]*

Oleg conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Afterwards, the FE-1 worked on updating/editing the standard daily IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

After last week's major semi-annual maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), Anderson configured the video equipment in the SM for filming his and Fyodor's subsequent TVIS workout, for biomechanical assessment of the hardware status by ground engineers. After downlinking the video at ~10:15am EDT, Clay dismantled and stowed the camera equipment.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS (CDR, FE-1, FE-2), RED resistive exerciser (FE-1, FE-2), and VELO cycle with bungee cord load trainer (CDR).

Later today, Oleg will transfer the crewmembers' exercise data file to the MEC

(Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary “time permitting” task list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second task from the Russian voluntary work list for Oleg was the regular status check on the long-term BIO-5 Rasteniya-1 (“Plants-1”) micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

*Saturday Science Preview:* Two optional activities for the voluntary “Saturday Science” program on the Sunday and Monday (9/16-17) were suggested to Clay for his choice. His selection is required by tonight. *[The two choices are (1) EPO (Educational Payload Operation) Kit C Plant Growth experiment, voice and video; and (2) BCAT-3 (Binary Colloidal Alloy Test-3) Magnet Unstick, using the CGBA-4 (Commercial Generic Bioprocessing Apparatus 4), powered up 12 hrs before.]*

*External OpsLAN Test:* Yesterday, FE-1 Kotov confirmed connectivity of EVA-installed LAN (Local Area Network) cables between the Node and the SM. Oleg relocated the SSC-3 laptop from the SM to the Node, connected it to OpsLAN (Operations LAN)/Ethernet in the Node and successfully “pinged” (i.e., sent a signal to) the Russian BRI Smart Switch Router in the SM.

*Propellant Transfer Update:* TsUP/Moscow was scheduled today to perform Progress M-60/25P propellant transfer from the cargo ship’s KDU refueling system to the low-pressure fuel and oxidizer tanks (BNDG & BNDO) 1, 2, 3 in the FGB module. No crew action was required. *[Propellant transfers from Progress M-61/26P are scheduled for tomorrow and Thursday.]*

*BCC Checkout Update:* Last night, the ground initiated the two-hour standard checkout of BCC (Backup Control Center) Swing and Activation procedures that would be necessary in the event of a flight control transfer from Houston to the HSG (Houston Support Group) at TsUP/Moscow. The checkout, which did not involve the crew, included PPCP (PrePlanned Command Package) uplinks from MCC-H via RS ground station.

Today's CEO (Crew Earth Observation) photo targets were **Kabul, Afghanistan** (*weather was predicted to be clear over the capital of Afghanistan. ISS orbit track was directly over the urban center, which is in a valley bounded by high mountain ranges to the W, NE, and SE. Overlapping nadir frames acquired along-track as the station approached, passed over, then left the urban center were requested. This will provide a rural-urban-rural land cover transect across the city*), **Vredefort Impact Crater, S. Africa** (*ISS had have a nadir pass over this large impact structure. Regional context imagery of the impact structure [overlapping nadir frames along-track] with the 180 mm lens will complement earlier detailed imagery of the crater*), and **Mt. Whitney, California** (*the highest peak in the contiguous United States, Mt. Whitney is one of the peaks of the Sierra Nevada. Looking to the left of track as the station approached the Sierra from the WNW; overlapping frames acquired as ISS traversed the range were to include Mt. Whitney. Imagery of the Sierra Nevada taken now will help provide a baseline for estimation of this coming winter's snowfall on the mountains*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
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**ISS Orbit** (*as of this morning, 8:59am EDT [= epoch]*):

Mean altitude -- 339.6 km  
Apogee height -- 345.5 km  
Perigee height -- 333.8 km  
Period -- 91.33 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0008665  
Solar Beta Angle -- -18.8 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in the last 24 hours -- 66 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 50440

Significant Events Ahead (*all dates Eastern and subject to change*):

09/12/07 -- Progress M-61/26P prop transfer (oxidizer) to ISS  
09/13/07 -- Progress M-61/26P prop transfer (fuel) to ISS  
09/14/07 -- Progress M-60/25P prop line purge/vent  
09/18/07 -- Progress M-60/25P undocking (SM aft port)  
09/24/07 -- ISS reboost (dV=3.4 m/s; setting up for Soyuz launch & 10A rendezvous)

on FD3)

09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
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01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
01/31/08 -- **50-Year Anniversary of Explorer 1** (1<sup>st</sup> U.S. satellite on Redstone rocket)  
02/06/08 -- Progress M-62/27P undocking  
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10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
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04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/10/07  
**Date:** Monday, September 10, 2007 2:05:49 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/10/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 21 of Increment 15.*

FE-1 Oleg Kotov continued the recently started dismantling of no-longer-needed SUD/MCS (Motion Control System) hardware in the FGB, to create new storage space, today focusing on CC-16A equipment. *[The FGB SUD provided attitude control to the ISS until the SM (Service Module) arrived in July 2000 and took over that function.]*

CDR Fyodor Yurchikhin supported ground specialists at TsUP-Moscow in a checkout of two Network Channel Controllers (KSK1,2) of the Russian Onboard Computer System (BVS), in preparation for ATV (Automated Transfer Vehicle) arrival next March. *[BVS is the backbone of the BKU Onboard Control Complex which consists of BVS, SUDN (Motion Control & Navigation System) and SUBA (Onboard Equipment Control System). The two redundant KSK units are used to provide the electrical data signals for transmission through docking assemblies, i. e., beyond the normal physical limitations of a data bus (MKO, equivalent to U. S. 1553B standard).]*

FE-2 Clay Anderson had another three hours reserved for unpacking equipment delivered by STS-118/13A.1, while the CDR spent about two hours on stowing discarded hardware on Progress M-60/25P for disposal, keeping track of the movements in the IMS (Inventory Management System). *[25P will be undocked next week, 9/18.]*

Yurchikhin set up the Russian biomedical "Pilot" experiment (MBI-15), which requires a table, ankle restraint system, electrodes, and two hand controllers (RUP) for testing piloting skill in "flying" simulations on a laptop (RSK1) under stopwatch control. He then conducted the experiment for the second time this Increment, supported by tagup with ground specialists via S-band. The Pilot-SMP-P gear was left in place, to be used next by FE-1 Kotov. *[Fyodor had to perform three flight control modes (fixed, slow and fast free-flyer), each one at least five times, after checkout and calibration of the control handles.]*

Anderson worked on ER4 (EXPRESS Rack 4), first swapping its older 760XD ELC (ER4 Laptop Computer) with a ThinkPad A31p machine, then upgrading the new ELC and the ER4 RIC (Rack Interface Controller) with a new software load (v. 2.030).

The FE-2 also completed the downloading of accumulated IWIS (Internal Wireless Instrumentation System) data from 13A and 13A.1 data takes, from RSUs (Remote Sensor Units) #1035 & #1028.

Yurchikhin used the CMS (Counter Measure System) to take readings of potentially harmful contaminants in the SM. The hardware was then returned to initial stowage. *[The CMS uses preprogrammed microchips to measure Formaldehyde (H<sub>2</sub>CO, methanal), Carbon Monoxide (CO) and Ammonia (NH<sub>3</sub>), taking one measurement per microchip.]*

In the Soyuz TMA-10/14S spacecraft, docked at the FGB nadir port, Yurchikhin turned on the spacecrafts gas analyzer (GA), a periodic procedure to monitor the atmosphere of the CRV (Crew Return Vehicle).

In preparation for storing FPMU (Floating Potential Measurement Unit) activity data, the CDR exchanged the tape on the VTR2 (Video Tape Recorder #2). *[ISS FPMU data is critical for FPMU verification and calibration, an important backup to the external PCUs (Plasma Contactor Units) to gage EVA hazard.]*

In the U.S. Airlock, Clay Anderson supported another periodic (50-day) maintenance/reconditioning cycle of U.S. EMU (Extravehicular Mobility Unit) batteries #2063 & #2041). *[Instead of the earlier 760XD laptop, Clay switched to an A31p SSC (Station Support Computer) with a commercial DOS application from floppy boot disk for automatically controlling the discharge in the BSA (Battery Stowage Assembly), with the BCs (Battery Chargers) switched to*

*discharge mode.]*

While in the Airlock, Clay performed an inspection of an EVA ratchet wrench after the STS-118 spacewalks, and also reviewed procedural OBT (Onboard Training) material for SAFER (Simplified Aid For EVA Rescue) troubleshooting.

The crew took reviewed OBT material to get acquainted with the advanced PCSR10U interface offered by their new PCS (Portable Computer System) laptop software upgrade which among else provides some improved functionality in dealing with controlling MDMs (Multiplexer/Demultiplexers).

Oleg Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Working off the discretionary “time permitting” task list, Fyodor updated/edited the standard IMS “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2) and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later this afternoon, the CDR will download the crew’s exercise data file to the MEC (Medical Equipment Computer) for downlinking, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary “time permitting” task list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

For Fyodor and Oleg, TsUP/Moscow also has designated two recurring tasks as “get-ahead” jobs, to be hard-scheduled at a later time: (1) an audit/inspection behind stowage panels in the ISS Russian segment (RS), to assess available

stowage room, and (2) to continue shooting photo/video footage of the RS modules' interiors.

*Russian Thermal Control System Update:* Since the 8/29 failure of the N1 pump on pump panel 4SPN1 of the Russian KOB-2 heating loop, KOB-2 has been functioning on one pump, while on loop 1 (KOB-1), both pump panels continued to run nominally. But last Friday (9/7), pump N2 failed on KOB-1, similar to the KOB-2 failure. Thus, each of the two KOB loops has now only one pump functioning. RSC-Energia is working to manifest replacement pumps as early as the next Soyuz launch (15S, on 10/10).

No CEO (Crew Earth Observation) photo targets uplinked for today.

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Solar Beta Angle -- -22.6 deg (magnitude decreasing)

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/09/07  
**Date:** Sunday, September 09, 2007 12:05:52 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/09/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for the crew except for housekeeping and voluntary work. Ahead: Week 21 of Increment 15.*

FE-1 Oleg Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including ASU toilet facilities systems/replaceables plus the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Kotov also gathered weekly data on total operating time & "On" durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

CDR Fyodor Yurchikhin continued his support of TsUP/Moscow in the ongoing two-week testing of the Russian ASN-M Satellite Navigation Equipment. *[As per standard procedure, Fyodor first temporarily closed down the data collection & saving application on Laptop 3, then copied the accumulated data to a 128MB flash card for subsequent downlinking via OCA/S-band for ground processing, and later re-started the application to continue collecting the raw ASN-M test data. ASN will be required for proximity operations and docking of the European ATV-1 (Automated Transfer Vehicle 1) "Jules Verne" to the SM aft end, currently planned for 3/3/08. The ground-controlled testing simulates the ATV rendezvous phase using the ASN system, and its results will be used to assess the ASN-M equipment's readiness for joint ATV operations.]*

The crewmembers completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2) and VELO cycle with bungee cord load trainer (CDR, FE-1).

Oleg Kotov has three voluntary jobs on the Russian "time permitting" task list for today:

1. The regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*
2. The standard health check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module; and
3. Another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Sony DSR PD-150P camcorder to obtain imagery of color bloom and cloud pattern anomalies from SM window #7. *[Photo targets were the Western section of the Black Sea, with the Danube estuary and wakes of turbulent water area in plankton fields of the Anatolian coastal area of Turkey, the Indian Ocean along the track, with the Oman coastal area and the commercial-production area west of Australia; and the Atlantic along the track from Newfoundland to the Western Sahara coastal area.]*

For CDR Yurchikhin, the discretionary task list for today called for another session of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature.

*[Photo targets were glaciers located to the north of Lake Issyk-Kul, the largest glaciers of Tien-Shan flowing to the west in Kirghizia, the Kalmyk Steppe in nadir on both sides of the track, the Delta branch of the Volga river, and, if detected, oil spills in the Caspian Sea.]*

At ~4:07pm EDT, Clay Anderson is scheduled for his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop).

*SAME Update:* Clay was thanked by POC (Payload Operations Center, Huntsville) for his excellent work yesterday on the Smoke Aerosol Measurement Experiment payload. *"We have completed our ground checkout and will be starting a SAME sample run today. We will keep you up to date on how it goes. Your next SAME activity is planned for next Friday after we have processed all six samples and are ready to power down the rack."*

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05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/08/07  
**Date:** Saturday, September 08, 2007 1:41:43 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/08/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- off-duty day for CDR Yurchikhin, FE-1 Kotov and FE-2 Anderson except for housekeeping and voluntary work.*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, the CDR and FE-1 performed preventive maintenance cleaning on the VPKhO, VdPrK & VPrK grilles plus V3 fan in the DC1 (Docking Compartment).

Oleg also gathered weekly data on total operating time & "On" durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

Getting one step closer to starting SAME (Smoke Aerosol Measurement Experiment) operations, FE-2 Anderson reviewed familiarization material for the experiment, then installed the equipment in the MGS (Microgravity Glovebox). *[Preparations included setting up the video gear, performing a leak check on the MGS VES (Vacuum Exhaust System) and GN2 (Gaseous Nitrogen) connections, and installing the sample carousel, alcohol wick and thermal precipitator, as CDR Yurchikhin took documentary imagery. The first run of SAME will be performed tomorrow after an overnight six-hour checkout by ground specialists. SAME creates smoke from common spacecraft materials in micro-G and then measures*

*three of the most significant aspects of the resulting aerosol: (1) the number count density, (2) the collective, summed diameter of the particles, and (3) the mass density. The responses of the smoke detectors currently in use on the Shuttle and the ISS will also be measured. The data will be used to verify a mathematical model that has been developed to predict the size, density and concentration of these and other materials in a similar environment as well as providing specific, empirical design criteria for the development of the next generation of space-based smoke detectors. SAME components in the MSG WV (Work Volume) include two mounting plates (Diagnostics Mounting Plate & Experiment Support Plate), Fluids Control Unit, Data Acquisition & Control Unit, Aging Chamber, Sample Carousel, cables, connectors, etc.]*

Anderson also provided the daily servicing of the EPO (Educational Program Operation) "Kit C" project, today taking photographs to document the growth of basil and lettuce plants in zero-G.

After lunch (~9:40am), Clay filled out the regular FFQ (Food Frequency Questionnaire), his tenth, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Anderson undertook the periodic (~monthly) PEP (Portable Emergency Provisions) safety inspection which was deferred yesterday when the crew ran late on the timeline. *[The IMS (Inventory Management System)-supported inspection involves verification that PFEs (portable fire extinguishers), PBAs (portable breathing apparatus), QDMAs (quick-don mask assemblies) and EHTKs (extension hose/tee kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware. In the U.S. segment (USOS), there are a total of 5 PFEs and 7 PBAs, plus 7 QDMAs and 4 EHTKs. Additionally, Clay used a piece of tape to mark a QDMA, which has an earpiece that failed during 13A.1/EVA-2 but is otherwise fully functional as breathing aid.]*

The crewmembers completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2) and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later in the afternoon, Clay will download the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the

HRM storage medium (done six times a week).

Working from the discretionary "time permitting" task list, Oleg Kotov completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second voluntary job for Kotov was to use the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

Also as one of the "job jar" tasks for today, CDR Yurchikhin conducted another session of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature. *[Today's Uragan photo targets were the Kursk Steppe, strip photography, pinpointed to nadir with overlapping shots, of farm lands to the south of Voronezh, the coast line of the northern part of the Lesser Aral Sea, the dam separating the Lesser Aral from the main body of the lake, the end of glaciers flowing toward Afghanistan and located to the west of Fedchenko Glacier, peaks of the Himalayas, the western slopes of the Carpathian mountains, the Kerch Strait and Taman peninsula, strip photography of the main Caucasus ridge forest cover and of glaciers near Teberda-Dambai, the Kolka glacier, woodlands on the northern slope of Lake Sevan, oil spills in the Caspian Sea, forest fires in Greece, the island of Lesbos in nadir, and cities of Israel.]*

At ~9:10am EDT, the crewmembers held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

The CDR and FE-1 had their weekly PFCs (Private Family Conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop), Fyodor at 7:40am EDT, Oleg at 8:45am.

*FGB SAW Retraction Preview:* Integration & safety analyses are underway at Moscow and Houston for the upcoming retraction of FGB solar array wings before STS-118/10A. During 10A/docked, the ISS starboard radiators will be deployed, followed by the port radiators shortly after 10A. These radiators provide the increased heat rejection required to support the addition of the ESA Columbus and

JAXA Kibo modules, but to avoid physical contact with the radiators, the FGB arrays must be completely retracted. Since the FGB arrays provide two-failure-tolerant electrical power to the FGB, their retraction will make the FGB solely dependent upon USOS (U.S. Segment) power feeds, although there is also a contingency electrical jumper available to reconnect USOS power to the FGB ARCU (American-to-Russian Converter Unit, for converting from U.S. 124V to Russian Segment 28V), which may bypass some USOS electrical failure conditions.

### **Weekly Science Update** (*Expedition Fifteen -- 19<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Next and last session in Inc15 is for card exchange. This last session is currently planned on 9/18.

*ANITA:* Planned.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2:* Data files from last session on 8/31 received by the Science Team which provided positive feed-back..

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS):* Continuing,

*CFE (Capillary Flow Experiment):* Reserve.

*CHROMOSOME-2 (E14 SFP):* Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* Complete.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* Powered off.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Next scheduled operation is 10/29-11/3.

*EMCH (Elastic Memory Composite Hinge):* Complete.

*EPO (Educational Payload Operation) Kit C:* Planned.

*IMMUNO (Saliva Sampling):* First session samples are currently stowed in MELFI Dewar #2.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* Investigation ongoing. Watering needs of plants are higher than anticipated.

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* Planned.

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION:* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*SAMPLE:* Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* n/a

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* In progress.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Planned.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 9/3 the ground has received a total of 12,992 CEO images for review and cataloging for Increment 15. From over 1400 frames of new imagery received this past week researchers have identified for prioritized review those images with camera times corresponding to the following CEO target request times: Cairo, Egypt; Tenoumer Impact Crater, Mauritania; Andrews Forest, Washington; Yellowstone National Park, Wyoming; and the Tigris-Euphrates Delta. To crew: "Thank you for your prompt downlink of your images of

*Hurricane Felix earlier this week. Three of these views were captioned and used by PAO and all have been cataloged and are available to the public on our website. We have noted a high frequency of long lens settings in your recent photography. Your focus technique is excellent now. Such photos show great detail of very small areas on the ground. Their usefulness is greatly increased when successive frames in such a session have sufficient overlap to allow mosaicking. This technique also improves the chances of the frame series to be located and cataloged. Please bear this in mind when using the long lens settings.”*

Today's CEO (Crew Earth Observation) photo targets were **Harvard Forest, Vermont** (*the crew had a nadir pass over the Harvard Forest LTER [Long Term Ecological Research] site area. This forest site, located approximately 70 miles to the west of the Boston metro area, maintains one of the longest-term records of forest growth and climate change in the New England area. Overlapping mapping frames along track were requested for comparison to historical imagery of the region*), **Puerto Rico** (*weather was predicted to be mostly clear over Puerto Rico. ISS orbit track brought the station over the western coastline of the island. Mapping of the western coastline was requested to track shoreline changes and offshore sediment flow*), and **GW Fire, Oregon** (*Dynamic Event. The GW Fire has been burning since late August, and is currently 60% contained. Six thousand acres have been burned so far, and the ISS orbit track provides an opportunity to view smoke plumes and burned areas. Looking to the left of track after the station crossed the Oregon coast - the burned area is located directly to the east of the Cascade Range volcanoes.*)

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 9:25am EDT [= epoch]*):

Mean altitude -- 339.9 km

Apogee height – 345.7 km

Perigee height -- 334.1 km

Period -- 91.33 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0008638

Solar Beta Angle -- -30.1 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 97 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50393

**Significant Events Ahead** (*all dates Eastern and **subject to change***):

09/14/07 -- Progress M-60/25P propellant line purge/vent  
09/18/07 -- Progress M-60/25P undocking (SM aft port)  
09/24/07 -- ISS reboost (dV=3.4 m/s; setting up for Soyuz launch & 10A rendezvous on FD3)  
09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/04/07 -- **50 Years of Spaceflight** (Sputnik 1)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/13/07 -- US EVA-10  
11/19/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
03/03/08 -- ATV-1 docking (SM aft port)  
04/04/08 -- ATV-1 undocking (SM aft port)  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking

05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/07/07  
**Date:** Friday, September 07, 2007 1:37:30 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/07/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, Yurchikhin, Kotov and Anderson conducted another session of the Russian biomedical routine assessments PZEh-MO-7/Calf Volume Measurement and PZEh-MO-8/Body Mass Measurement (ninth time for CDR & FE-1, sixth for FE-2), using the IM mass measurement device which Oleg Kotov afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

CDR Yurchikhin and FE-2 Anderson completed the second day of the regular six-month IFM (Inflight Maintenance) work on the TVIS (Treadmill with Vibration Isolation & Stabilization), including detailed chassis inspections, roller bearing assembly changeout, and flywheel & transfer case lubrication. *[Today's work entailed removal of the treadmill from the SM "pit", disassembly of forward components such as the flywheel case and transfer case, lubrication of both of their splines and re-installation of the components, inspection of the gyroscope and aft TVIS components, replacement of the electronic box battery (for maintaining TVIS time & date), retrieval, lubrication & restowage of the SPD (Subject Positioning Device) Top Assemblies, replacing all four IRBAs (Isolation Restoration Bungee Assemblies), other general inspections, and reinstallation of the treadmill in the SM (Service Module) floor. An unmanned 20-min speed characterization test*

*concluded the activities. On yesterday's Part 1 work, two hours were lost due to procedural problems in gaining access to the roller bearings underneath the belt. The TVIS team is investigating alternative methods for future IFMs.]*

FE-1 Kotov completed the current Onboard Equipment Control System (SUBA) outfitting by installing cables for connecting the newly installed PPS-31 System Power Panel and BSKN-25 Load Power Switching Unit, both required to support the installation of additional power outlets in the RS (Russian Segment).

The CDR continued his daily support of TsUP/Moscow in the ongoing two-week testing of the Russian ASN-M Satellite Navigation Equipment. *[Fyodor first temporarily closed down the data collection & saving application on Laptop 3, then copied the accumulated data to a 128MB flash card for subsequent downlinking via OCA/S-band for ground processing, and later re-started the application to continue collecting the raw ASN-M test data. ASN will be required for proximity operations and docking of the European ATV-1 (Automated Transfer Vehicle 1) "Jules Verne" to the SM aft end, currently planned for 3/3/08. The ground-controlled testing simulates the ATV rendezvous phase using the ASN system, and its results will be used to assess the ASN-M equipment's readiness for joint ATV operations.]*

Clay Anderson undertook the periodic (~monthly) PEP (Portable Emergency Provisions) safety inspection. *[The IMS-supported inspection involves verification that PFEs (portable fire extinguishers), PBAs (portable breathing apparatus), QDMAs (quick-don mask assemblies) and EHTKs (extension hose/tee kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware. In the U.S. segment (USOS), there are a total of 5 PFEs and 7 PBAs, plus 7 QDMAs and 4 EHTKs. Additionally, Clay used a piece of tape to mark a QDMA, which has an earpiece that failed during 13A.1/EVA-2 but is otherwise fully functional as breathing aid.]*

The FE-2 did the regular bi-weekly maintenance reboots of the SSC (Station Support Computer) File Server and OCA Comm Router laptops as well as the weekly reboots of the PCS (Portable Computer System) A31p laptops.

Continuing his support of the MELFI (Minus-Eighty Laboratory Freezer for ISS) facility, Anderson swapped front and rear quarter box modules in Dewar 4 (powered off before the activity, i.e., not freezing). *[Modules were exchanged between Sections 1 & 4 in Trays A, B, C, & D, to place the Icepacs closest to the Dewar door for keeping the samples colder in the back of the Dewar (there is a temperature gradient from front to back of as much as 2 degC - which could mean the difference between preserved and damaged samples.)*

In support of SAME (Smoke Aerosol Measurement Experiment) operations

scheduled tomorrow, Clay also was to check and charge (as needed) the batteries of the scopemeter. *[The latter will be required to help verify the integrity of the vacuum and nitrogen connections between SAME and the MSG WV (Microgravity Glovebox Work Volume).]*

The FE-2 completed the periodic (monthly) CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout on the prime unit (#1060) and backup unit (#1057). *[The CSA-CP is a passive cabin atmosphere monitor that provides quick response capability during a combustion event (fire). Its collected data are stored on a logger. Clay changed out the prime unit's battery, then zero-calibrated both instruments (to eliminate drift in the combustion sensors). Following zero calibration, the backup unit was stowed, while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

Later today, Anderson is scheduled to do the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries are to be replaced if necessary. *[Purpose of the 10-min. activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements. Two CSA-CP (CSA-Combustion Products) instruments recorded O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post (#1060, prime) and in the Node (#1057, backup), while the CSA-O<sub>2</sub> units (#1063, #1042) looked for O<sub>2</sub> in the Lab and the CDMK (#1008) for CO<sub>2</sub> in SM and Lab. Also recorded were battery ticks. The instruments were turned off afterwards, except for the prime CSA-CP #1060 unit, and returned to their regular locations.]*

Yurchikhin completed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Kotov is to work on the IMS (Inventory Management System) for the daily updating/editing of the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene); on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR), RED resistive exerciser (CDR, FE-1, FE-2) and VELO cycle with bungee cord load trainer (FE-1).

Later in the afternoon, the FE-2 will download the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from the discretionary "time permitting" task list, Kotov completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second task from the Russian "job jar" list for Oleg was the standard health check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

At ~4:10am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~4:40am, Fyodor and Oleg linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing stowage issues and equipment locations.

At ~12:00pm, Fyodor and Oleg downlinked an audio message of greetings to Vyacheslav Petrovich Salnitsky, a Department Deputy Manager at Moscow's IBMP (Institute of Bio-Medical Problems, Russian: IMBP/Institute of Medico-Biological Problems). *[Salnitsky, a veteran of manned cosmonautics for over 40 years, is currently presiding over a scope of activities related to ISS crew psychological flight support (psycho-neurological monitoring, rest/work schedule, psychological support). "... You are known as a tireless worker who for many years has been dealing with professional activity of operators in the space area, involved in research of methods and tools for assessing professional adequacy, and, most importantly, in the quest for new methods to maintain this adequacy. The unique PILOT ground/space simulator that you created has served well for many years to flight crews in long-duration missions..."]*

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio will be conducted at ~3:30pm.

*Nitrogen Transfer:* Transfer of gaseous nitrogen (N<sub>2</sub>) from the FGB fuel tanks is scheduled for today. Subsequently, the FGB tanks will be refueled with propellants from Progress 26P, currently planned for 9/11, followed by line purging/venting on 9/14. 26P undocking is scheduled for 9/18.

Today's CEO (Crew Earth Observation) photo targets were **Virginia Coast Reserve, Virginia** (*the crew had a nadir pass over this coastal LTER [Long Term Ecological Research] site. Overlapping nadir mapping frames along-track were requested. Features of interest for investigation of ecological change include developments along the Chesapeake Bay coastline that ISS passed directly over*), and **Santa Barbara Coast, California** (*the orbit took ISS over the E-W trending steep mountains that form the northern boundary of the Santa Barbara Coastal LTER site. High resolution photography of the mountain peaks, ridgelines, and south-facing slopes is useful to track land use and vegetation change that could affect water and sediment flow towards the coastline. The station approached the mountains from the NW, and the crew was advised to look to the right of track for the central spine of the mountains. The City of Santa Barbara was visible along the coastline, also to the right of track*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:50am EDT [= epoch]*):

Mean altitude -- 340.0 km

Apogee height -- 345.7 km

Perigee height -- 334.2 km

Period -- 91.33 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008586

Solar Beta Angle -- -33.5 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in the last 24 hours -- 95 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50376

**Significant Events Ahead** (*all dates Eastern and **subject to change***):

09/14/07 -- Progress M-60/25P propellant line purge/vent

09/18/07 -- Progress M-60/25P undocking (SM aft port) **new date**

09/24/07 -- ISS reboost (dV=3.4 m/s; setting up for Soyuz launch & 10A rendezvous on FD3)  
09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/04/07 -- **50 Years of Spaceflight** (Sputnik 1)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/13/07 -- US EVA-10  
11/19/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
03/03/08 -- ATV-1 docking (SM aft port)  
04/04/08 -- ATV-1 undocking (SM aft port)  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch

08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 -- **Constellation's Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/06/07  
**Date:** Thursday, September 06, 2007 12:42:46 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/06/07**

All ISS systems continue to function nominally, except those noted previously or below.

After their detailed procedures review yesterday, CDR Yurchikhin and FE-2 Anderson today began the scheduled six-month IFM (inflight maintenance) work on the TVIS (Treadmill with Vibration Isolation & Stabilization), including detailed chassis inspections, roller bearing assembly changeout, and flywheel & transfer case lubrication. *[Today's scheduled work, of >6 hrs, accomplished chassis inspection and replacement of 10 center roller bearings on each side of the truss after the belt was temporarily untensioned and the aft drum adjusted. Some issues involving tools, access to some roller bearings, and procedures execution had to be overcome. Afterwards, the TVIS was returned to its original "safe" configuration (so not to leave an inoperable TVIS in the event of a timeline change). Tomorrow, the work schedule will entail treadmill removal from the SM (Service Module) "pit", disassembling forward components such as the flywheel case and transfer case, lubricating both of their splines and reinstalling the components, inspecting the gyroscope and aft TVIS components, replacing the electronic box battery, inspecting the SPDs (Subject Positioning Devices), other general inspections, and reinstalling the treadmill in the SM floor. An unmanned 20-min speed characterization test will conclude the activities. Total time for two days required for both Clay and Fyodor: 16 hrs.]*

FE-1 Kotov continued the extensive SM outfitting with a new System Power Panel (PPS-31) behind panel 118 and the cabling to allow the installation of additional power outlets. Today's work was divided into two parts, each for routing & connecting three cables. More to come tomorrow. *[The spaces behind panel 118 had originally been explored by Sergei Krikalev on 5/30/05 preparatory to the PPS-31 installation planning and cable tree manufacturing.]*

Yurchikhin cleared room behind SM panel 136 by removing three P-16 filter units

and setting them up behind panel 129.

After installing, on 9/4, the new KL-211 MPEG-2 Encoder for the “Klest” television system to support ATV (Automated Transfer Vehicle) prox ops and docking, the CDR today used a new NASA MPEG2 viewer (NViewer 1.0) on the RSS1 A31p laptop for testing the KL-211 by verifying that it is sending correct data via OpsLAN.

Oleg Kotov performed the periodic data collection and downlink on the long-term BIO-5 Rasteniya-1 (“Plants-1”) micro-G plant growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse.

Anderson conducted the weekly 10-min. CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated “cue cards” based on the crew’s water calldowns are sent up every other week. The current cue card, to be updated with today’s data, lists 31 water containers (~1190 liters total) for the four types of water identified on board: technical water (806.9 l, for Elektron, flushing, hygiene), potable water (351.2 l), condensate water (13.2 l), waste/EMU dump and other (19.0 l.)]*

Clay also provided the daily servicing of the EPO (Educational Program Operation) “Kit C” project, taking photos today to document the plant growth in zero-G. *[The demo/experiment studies the growth of basil and lettuce in zero-G, in support of an Engineering Design Challenge for K-12 students of all abilities. During the 20-day run, Clay takes still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants will be watered on all odd numbered days. To determine if the plants need water, Clay looks in a viewport to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation, it’ll be crew’s choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

The CDR performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Yurchikhin also worked on the IMS (Inventory Management System), updating/editing the standard IMS “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crewmembers completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene); on the CEVIS cycle ergometer (FE-2), RED resistive exerciser (CDR, FE-1, FE-2) and VELO

cycle with bungee cord load trainer (CDR, FE-1).

Later in the afternoon, the FE-2 will download the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from the discretionary "time permitting" task list, Kotov completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

*BCC Dry Run:* Early this morning, starting at 1:00am EDT and running for seven hours, MCC-Houston and its Moscow support group (HSG) conducted another BCC (Backup Control Center) dry run in test mode, with no involvement of the ISS crew or vehicle. *[Purpose of this periodic exercise is to demonstrate BCC functionality under Russian assets while providing proficiency training for HSG personnel at the HSR (Houston Support Room) and TsUP-Moscow specialists. The ISS EMCC (Emergency Mission Control Center), located in Russia, comprises TsUP/Moscow as the Lead Control Center, coupled with HSR at TsUP. The BCC facility provides a command & control capability from TsUP if the EMCC must be activated. This is the case in situations that render MCC-Houston unable to provide telemetry, voice, and command capability for extended periods. EMCC is also used when the threat of severe weather results in evacuation of the MCC-H building for extended periods. In such an emergency, both Russian servers (CMD/command & TM/telemetry) are transitioned from MCC-H connectivity to BCC configuration, after which only the BCC can connect to the CMD and TM ports. An actual contingency requiring switchover to the BCC occurred on 10/2/2002 when Hurricane Lili forced MCC-H to shut down at 4:00am EDT, and also two years ago during the Hurricane Katrina emergency.]*

*Solar Array Drag Reduction:* Plans are being made for setting solar array BGA (Beta Gimbal Assembly) Autotrack mode (suntracking) to dual-angle ("night glider") configuration biased for drag reduction ("night glider"), starting on 9/12. *[Purpose: (1) Save 50-60 kg of ISS propellant prior to 10A launch, (2) increase expected number of consecutive launch attempts with FD3 docking for 10A from 11 to 15 days, and (3) improve reboost planning by providing about a week to assess the drag reduction performance prior to designing the 9/24 reboost.]*

*ASN-M Testing Update:* TsUP/Moscow is continuing the two-week tests of the Russian ASN-M Satellite Navigation Equipment. Testing will be finished on 9/11.

*Russian Thermal Control System Update:* After the failure, on 8/29, of the N1 pump on pump panel 4SPN1 of the Russian KOB-2 heating loop, KOB-2 continues functioning on one pump, until a spare can be delivered on the next Progress. On Loop 1 (KOB-1), both pump panels are functioning nominally.

*Rodnik Water Transfer Update:* Data received 9/4 during the transfer of water from the Rodnik BV2 tank of Progress 26P to the SM BV1 tank may be indicating a leak in the inner membrane of the Progress BV2 tank, needed for pushing the water out. Specialists are investigating. Should a leak be confirmed, the BV2 would be declared unavailable for receiving liquid waste (urine) before 26P jettisoning.

*Nitrogen Transfer:* Transfer of gaseous nitrogen (N<sub>2</sub>) from the FGB oxidizer tank to the SM was successfully completed. N<sub>2</sub> transfer from the FGB fuel tank is scheduled tomorrow (9/7). Subsequently, both tanks will be refueled with propellants from Progress 26P, currently planned for 9/11, followed by line purging/venting. *[26P undocking is now scheduled for 9/18, i.e., one day earlier].*

Today's CEO (Crew Earth Observation) photo targets were **Metropolitan Manila, Philippines** (*nadir pass over this capital city on the east side of Manila Bay. Metro Manila is now home to more than 10 million people. Crew was to shoot the margins of this huge urban center*), **Aral Sea, Kazakhstan, Central Asia** (*a fraction of its former size, the Aral Sea continues its slow decline in area, fragmenting into a series of smaller water bodies. Water is extracted from the main feeder rivers for crops, especially cotton at the south end of the sea. Crew was to shoot margins of the main water bodies*), and **Georgia Coastal Ecosystems, USA** (*crew was asked to shoot a mapping swath of overlapping images a little right of track. This is an LTER [Long Term Ecological Research] site where land use and ecological changes around urban centers are monitored*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:53am EDT [= epoch]*):

Mean altitude -- 340.1 km

Apogee height – 345.8 km

Perigee height -- 334.4 km

Period -- 91.34 min.

Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0008487  
Solar Beta Angle -- -36.4 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.76  
Mean altitude loss in the last 24 hours -- 102 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 50361

**Significant Events Ahead** (*all dates Eastern and **subject to change***):

09/14/07 -- Progress M-60/25P propellant line purge/vent  
09/18/07 -- Progress M-60/25P undocking (SM aft port) **new date**  
09/24/07 -- ISS reboost (dV=3.4 m/s; setting up for Soyuz launch & 10A rendezvous on FD3)  
09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/04/07 -- **50 Years of Spaceflight** (Sputnik 1)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/13/07 -- US EVA-10  
11/19/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
03/03/08 -- ATV-1 docking (SM aft port)  
04/04/08 -- ATV-1 undocking (SM aft port)  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)

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09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- **Six-person crew on ISS**  
04/15/09 – **Constellation’s Ares I-X Launch**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/05/07  
**Date:** Wednesday, September 05, 2007 2:42:50 PM  
**Attachments:**

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**ISS On-Orbit Status 09/05/07**

All ISS systems continue to function nominally, except those noted previously or below. *A day of medical exams on board.*

Before breakfast & first exercise, CDR Yurchikhin, FE-1 Kotov and FE-2 Anderson completed another session with the Russian crew health monitoring program's medical assessment MO-9/Biochemical Urinalysis. The FE-1 stowed the Urolux hardware afterwards. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

Afterwards, Yurchikhin and Anderson, both assisted by FE-1, and Kotov, assisted by FE-2, also did the second part of the PHS assessment, without blood labs. Subsequently, Oleg completed data entry for both of them and stowed the PHS hardware. *[The U.S. PFE w/o Blood Lab is a monthly 1.5-hr. procedure which checks up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (cycle ergometer with vibration isolation) in the Lab. Readings are taken with the BP/ECG (blood pressure/electrocardiograph) and the HRM (heart rate monitor) watch with its radio transmitter. BP/ECG provides automated noninvasive systolic and diastolic blood pressure measurements while also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise.]*

Fyodor and Oleg set up the work area for the Russian science payload BIMS (MBI-22) and unstowed the hardware. For the subsequent experiment activity, the two cosmonauts took turns as subject and assistant, supported by ground specialist tagup. Today's runs included otoscopic, nasal, dental and dermatological exams.

*[BIMS objective is to conduct several experimental sessions in the RS (Russian segment) for filming skin portions and mucous membranes of crewmembers. It is part of a comprehensive research into using telemedical technologies for getting information from distant space crews for medical support of human space missions and information for life science flight studies. The BIMS experiment uses image capturing (video & still photo), an otoscope (or auriscope - the familiar medical device for visualizing the outer & middle ear, nose and upper throat area), the RSE-med A31p laptop and PCMCIA memory cards, with data files downlink via BSR-TM to study small skin sites, conduct otorhinolaryngologic examinations (external acoustic meatus, eardrums, nasal passages), and do stomatologic (i.e., medical study of mouth and its diseases) examination of gums and teeth.]*

Later, Clay Anderson broke out and set up the OUM-PFE (Oxygen Uptake Measurement - Periodic Fitness Evaluation) equipment on the HRF-2 (Human Research Facility 2) rack to obtain measurements on himself on the CEVIS cycle ergometer according to protocol, with Oleg Kotov acting as OUM-PFE operator. *[The operations were documented with photo and video. In closing out, Clay updated the evaluation protocol, deactivated & stored the gear, including photo/video equipment, and turned off the OUM-PFE laptop.]*

The FE-1 had 30 min. reserved for completing another radiation data monitoring & logging session for flow & dose power data with the Matryoshka-R radiation payload and its LULIN-5 electronics box.

Clay retrieved and stowed the two FMKs (Formaldehyde Monitoring Kits) deployed by him on 9/3 in the Lab (below CEVIS cycle) and SM (most forward handrail).

Yurchikhin performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the periodic checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

Fyodor also spent an additional half hour in the ASU compartment for removal and replacement of the air/ventilation filter, discarding the old unit as trash.

Later, the CDR worked on the IMS (Inventory Management System), updating/editing the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

CDR Yurchikhin used the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system to collect the periodic cabin air readings. *[GANK tests for*

*Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

FE-1 Kotov completed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water collected in CWC (Contingency Water Container) #1021 from the Lab CCAA (Common Cabin Air Assembly) dehumidifier. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Yurchikhin continued his daily support of TsUP/Moscow in the ongoing two-week testing of the Russian ASN-M Satellite Navigation Equipment. *[Fyodor first temporarily closed down the data collection & saving application on Laptop 3, then copied the accumulated data to a 128MB flash card for subsequent downlinking via OCA/S-band for ground processing, and later re-started the application to continue collecting the raw ASN-M test data (see also Note below).]*

Anderson conducted his regular daily servicing of the EPO (Educational Program Operation) "Kit C" project, today by checking the growth chamber for humidity. *[The demo/experiment studies the growth of basil and lettuce in zero-G, in support of an Engineering Design Challenge for K-12 students of all abilities. During the 20-day run, Clay takes still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants will be watered on all odd numbered days. To determine if the plants need water, Clay looks in a viewport to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation, it'll be crew's choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

Clay also performed the periodic status checkup & filter inspection of the running CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to Earth.]*

Working some more on the MELFI (Minus-Eighty Laboratory Freezer for ISS) facility, Anderson today inserted 12 Icepac belts in Dewar 3 to continue preparing it for future use. *[After today's big insert, several smaller inserts of two Icepacs each into Dewars 1 & 2 are scheduled for the near future. Icepacs are used as thermal mass to keep samples cold during return and during extended MELFI power downs (e.g. during Soyuz relocate). No more than two ambient-temperature Icepacs may be inserted at any given time into a Dewar that has samples in it, to protect the*

*samples from warming up.]*

Yurchikhin and Anderson reviewed the uplinked procedures of tomorrow's and Friday's planned TVIS treadmill six-month maintenance which includes detailed chassis inspections, roller bearing assembly changeout, and flywheel & transfer case lubrication. Before sleep time tonight, the FE-2 will deactivate the TVIS power circuit breaker. *[Preparations, chassis inspection and replacement of 10 center roller bearings on each side of the truss will be done on the first day, with the TVIS then to be returned to its original "safe" configuration (so not to leave an inoperable TVIS in the event of a timeline change). The second day will feature TVIS removal from the SM "pit", disassembling forward components such as the flywheel case and transfer case, lubricating both of their splines and reinstalling the components, inspecting the gyroscope and aft TVIS components, replacing the electronic box battery, inspecting the SPDs (Subject Positioning Devices), other general inspections, and reinstalling the treadmill in the SM floor. An unmanned 20-min Speed Characterization Test will conclude the activities. The data from the test and the first exercise session will be downloaded for review immediately. Total time required for both Clay and Fyodor: 16 hrs.]*

For the crew's subsequent workouts on the RED (resistive exercise device), Anderson set up the video camcorder for filming the sessions. Afterwards, the video equipment was put in stowage again. *[The RED video, showing the apparatus on the "ceiling" hatch of the Node, is periodically required to support biomechanical evaluation of the exercising crewmember and assessment of the on-orbit setup of equipment during data collection.*

The crewmembers completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene); on the CEVIS cycle ergometer (CDR/PFE, FE-1/PFE, FE-2/OUM-PFE), RED resistive exerciser (FE-2) and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, the FE-2 will download the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~9:45am EDT, the CDR tagged up with TsUP-Moscow specialists via S-band on the topic of the internal lighting system.

At ~2:35pm, Clay is scheduled to power up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), to conduct, at 2:40pm a radio exchange with students at Gail Borden Public Library, Elgin, Illinois. Questions to the crew were uplinked by ARISS beforehand.

*[Gail Borden Library is over 130 years old with a long history of providing materials and services to community members. The first library building was donated by the family of Gail Borden, the inventor of condensed milk. The Library has a history of being innovative. GBPL was the first library in the country to create a center for preschoolers, offering intellectual and social stimulation in a creative, hands-on environment. GBPL was one of the first libraries in the country to install a fiber optic network, linking the library with the City of Elgin and six area schools. Other distinguishing hallmarks include developing services for the Hispanic population with the addition of Spanish-language materials and formation of a steering committee which led to the creation of a literacy training organization. "Do you have to wear a lot of special equipment while in space?"; "What are your daily jobs up in space station?"; "Are you weightless in the ISS and if you are, how does it feel?"; "Is it hard to stay in space so long?"; "How good are the computers that you use?"; "How do you read in outer space and what books are you reading now?"; "Is it ever sort of scary or strange being in space?"]*

Working from the discretionary "job jar" task list, Kotov completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second job from the Russian "at-choice" task list for Oleg was the regular health check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

*ASN-M Testing Update:* Yesterday's ATV (Automated Transfer Vehicle) docking rehearsal, with the station held by Russian thruster control in the required attitude (Yaw/Pitch/Roll = 0,0,0), went well, except for somewhat greater than expected attitude errors on each axis (max ~1.8 deg instead of <1 deg). Uplinking missing dynamics loop coefficients, inadvertently left out during the 8/22 restart of the TVM navigation computer, corrected the issue. *[The rehearsal consisted of (1) preparation of the estimated state vector which will be calculated for the actual ATV docking using the data received from the ASN-M, and (2) the attitude-hold test on RS thrusters for ATV docking until the estimated mechanical capture, for a period of approximately 4.5 hours. Proximity operations and docking of the European ATV-1 "Jules Verne" at the SM aft end are currently planned for 3/3/08. The ground-controlled testing simulates the ATV rendezvous phase using the ASN system, and its results will be used to assess the ASN-M equipment's readiness for joint ATV*

*operations.]*

*CMG Gimbal Characterization Test: Taking advantage of the vehicle being under RS thruster control for a sufficient period of time, MCC-H last night conducted a gimbal characterization test for the recently-installed CMG-3 (Control Moment Gyroscope #3). [CMG-3's inner and outer gimbals were separately rotated a full 360 deg in each direction. CMG-4 was added to the test and the gimbals for both were rotated such that the momentum vectors canceled, thus minimizing propellant usage. The spin motor current (an indicator of drag torque on the spin bearings) was observed, as well as other CMG health parameters. As expected, CMG-3 motor current showed little or no change for each gimbal motion, whereas CMG-4 current changed slightly depending on gimbal direction. No anomalous vibrations were observed and no fault flags for these two CMGs were set at any time. Telemetry data are under review.]*

*Today's CEO (Crew Earth Observation) photo targets were London, England (weather is finally clearing. Looking nadir and a touch left to shoot margins of the city in particular), Tigris-Euphrates Delta (crew was asked to shoot a mapping pass near nadir as they crossed the coast, in a repeat pass of a few days ago. Coastline detail was requested), Wild fires, Algeria (DYNAMIC EVENT: Aiming left of track along Algeria's coastline for panoramic views of a major smoke event), and Cloud plume, Texas (DYNAMIC EVENT: A major cloud plume 1500 miles long, derived from Hurricane Henriette off Baja California, is spreading NE into the southern USA. Moisture from this plume will enhance rainfall over many already-wet states for the next couple of days. The crew was to shoot right of track towards Henriette as they crossed the plume, for wide-angle views of this weather maker).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 8:43am EDT [= epoch]):*

Mean altitude -- 340.2 km

Apogee height -- 345.8 km

Perigee height -- 334.5 km

Period -- 91.34 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008454

Solar Beta Angle -- -39.0 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 110 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50345

**Significant Events Ahead** (*all dates Eastern and subject to change*):

09/14/07 -- Progress M-60/25P propellant line purge/vent

09/19/07 -- Progress M-60/25P undocking (SM aft port)

09/24/07 -- ISS reboost (dV=3.4 m/s; setting up for Soyuz launch & 10A rendezvous on FD3)

09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/04/07 -- 50 Years of Spaceflight (Sputnik 1)

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/13/07 -- US EVA-10

11/19/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis/1E undocking

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/26/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

02/06/08 -- Progress M-62/27P undocking

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour/1J/A undocking

03/03/08 -- ATV-1 docking (SM aft port)

04/04/08 -- ATV-1 undocking (SM aft port)

04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)

04/23/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)

04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.

04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- Six-person crew on ISS  
04/15/09 -- Ares I-X Launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/04/07  
**Date:** Tuesday, September 04, 2007 2:30:07 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/04/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-2 upgraded the software of SIGI-1 (Space Integrated GPS/Inertial Navigation System #1), updating its firmware load to version R3. *[For accessing SIGI-1, Anderson had to rotate a Lab rack down (LAB1S6), which required powering off the active Lab CCAA (Common Cabin Air Assembly) air conditioner for the duration of the activity. The software upgrade enables SIGI1 to determine attitude using the only two remaining operational USOS GPS antennas. GPS-2 anomalies encountered on 8/30 (ref. 9/1 report) have been cleared with repeated power cycles and reinitializations.]*

FE-1 Kotov worked on the Russian payload matching unit/computer (BSMM), upgrading both hard disk drive partitions with new software from the RSS1 laptop, after a successful payload server (BSPN) functionality test.

Afterwards, CDR Yurchikhin continued the latest outfitting of the RS (Russian Segment) "Klest" television system for ATV (Automated Transfer Vehicle) prox ops and docking, by removing two old commutator (switching) boxes (KU-110M, KU-120M) and replaced them with a new KL(Klest)-211 MPEG-2 Coder. *[After completion of Kotov's BSMM upgrade, the KL-211 was connected to the Ethernet OpsLAN.]*

The FE-1 also prepared tools, cables and hardware for the upcoming extension of SUBA (Onboard Equipment Control System) and SBI (Onboard Data Measuring & Storage System) capability, through provision of additional power outlets in the Service Module (SM) and enabling vacuum cleaner use in the FGB and DC1 (Docking Compartment). *[The SUBA/SBI outfitting activities are scheduled on 9/6, 9/7, 9/10, and 9/11.]*

The CDR later supported the ground in reactivating the Elektron oxygen generator, which had to be turned off since the preceding KL-211 coder installation required temporary disconnecting the BITS2-12 Onboard Telemetry Measurement System. *[Reactivation was at 32 amps, and as usual Fyodor monitored the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

After Flight Controllers deactivated the CDRA (Carbon Dioxide Removal Assembly) early this morning, and cooling was no longer required, Anderson disconnected the ITCS LTL QD (Internal Thermal Control System/Low Temperature Loop/Quick Disconnect) jumper.

Kotov used the Russian AK-1M adsorber and Draeger tubes to conduct the periodic sampling of cabin air for subsequent analysis on the ground. *[Kotov started out by taking air samples in the SM and FGB and to check for leaked-out Freon in the SM, then switched to the IPD-CO Draeger tubes sampler to check for CO (carbon monoxide) in the SM.]*

Later, Oleg also collected air samples with a U.S. GSC (Grab Sample Container) at the center of the Lab and SM.

After tagging up with payload specialists for a Periodic Fitness Evaluation (PFE) conference, Clay Anderson broke out and set up the PFE-OUM (PFE-Oxygen Uptake Measurement) equipment on the HRF-2 (Human Research Facility 2) rack, including the HRF PFM/PAM (Pulmonary Function Module/Photoacoustic Analyzer Module), Mixing Bag System and GDS (Gas Delivery System). Data collection is scheduled tomorrow. *[The Periodic Fitness Evaluation with Oxygen Uptake Measurement experiment demonstrates the capability of crewmembers to perform periodic fitness evaluations with continuous oxygen consumption measurements within 14 days after arrival on ISS, and once monthly during routine PFEs. Once the capability of the pulmonary function system (PFS) to perform PFEs is verified, crewmembers will be able to integrate their monthly PFE with oxygen consumption measurements to fulfill the requirement for cardiovascular fitness evaluations during long-duration space flight.]*

The FE-2 undertook the monthly (Week 20) potable water sampling for post-flight chemical analysis, using jointly approved Russian sampling procedures with the U. S. WS&A (Water Sampler & Archiver) kit for collection. *[Samples were taken in the SM at the potable water SRV-K hot port and from the EDV container of the SVO-ZV*

*water supply system. From each port, Clay collected two 225 mL microbial samples for on-board processing and two 750 mL chemical archival (post-flight) samples for return to Earth on 10A, using Russian collection procedures. The flush water, collected in a water bag, is to be reclaimed for technical use.]*

After the leak-test compression of the SM's Rodnik BV1 tank bladder on 8/18, Kotov hooked up the necessary "plumbing" for transferring potable water from the BV2 tank of Progress M-61/26P to the SM Rodnik BV1 water tank. *[The water transfer, monitored by Oleg several times during the day, at first was by self-flow (under its own tank pressure), then using a compressor pump via a GZhS gas/liquid separator, to remove air bubbles in the water. Filling of the empty Progress BV1 & BV2 tanks with urine will be scheduled later.]*

Clay completed his third run with the MedOps WinSCAT (Spaceflight Cognitive Assessment Tool) experiment by logging in on the MEC (Medical Equipment Computer) and performing the psychological evaluation exercise on the laptop-based WinSCAT experiment. *[WinSCAT is a time-constrained questionnaire test of cognitive abilities, routinely performed by astronauts aboard the ISS every 30 days before or after the PHS (periodic health status) test or on special CDR's, crewmembers or flight surgeons request.]*

The CDR conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Fyodor also did the daily IMS (Inventory Management System) updating, editing its standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew performed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-1, FE-2), TVIS treadmill (CDR), and RED resistive exerciser (CDR, FE-1, FE-2).

Later, Yurchikhin will download the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~3:25am EDT, Yurchikhin, Kotov and Anderson joined in downlinking a TV message of greetings in connection with the 60<sup>th</sup> Anniversary of the Russian 38<sup>th</sup> Airborne Forces Special Signal Regiment. *["The legendary airborne infantry is among the armed forces elite troops. They have always been faithful to their*

*military duty, courageous and dedicated, highly professional and brave, imbued with fighting spirit, brotherly solidarity, and teamwork... The Y.A. Gagarin Cosmonaut Training Center has been your neighbor near Moscow for over 35 years. Over the years, we've become good friends. You are always dear and welcome guests at Star City..."]*

At ~10:30am, the crew also supported a live TV/PAO event with students at Collier County Public Schools, Naples, FL, via S- & Ku-band. Questions to the crew were uplinked beforehand. [*"What effect does Earth's gravity have on the human body once someone returns from a long stay on the ISS?"; "What is the procedure if the ISS's ventilation system failed?"; "Oleg, we read that you like photography, can you tell us about some pictures you have taken from space?"; "Have any seeds that have been exposed to space been planted here on Earth? And if so, what were the results?"; "Clay, we read that you write music, sing and play the piano, what is it like to do these things in space?"; "What is a "walkoff" with the robotic arm?"*]

At ~3:50pm, Clay is scheduled to power up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), and at 3:55pm conduct a radio exchange with ham operators on the ground.

Working from the discretionary "job jar" task list, Kotov completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). [*This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.*]

*ASN-M Testing Update:* Satellite Navigation System (ASN-M) testing is going successfully, with no error messages or antennae switch-overs. The test runs through 9/11. A special test will be conducted tonight, requiring the ISS to maneuver to an attitude of YPR (yaw, pitch, roll) of 0,0,0, held by RS thrusters. Attitude control authority will be handed over to RS at 7:08pm EDT, with the maneuver following at 7:53pm. Return to LVLH +ZLV TEA (Local Vertical Local Horizontal/+Z-axis in local vertical/Torque Equilibrium Attitude) will be at 11:38pm, followed by control return to U.S. CMG momentum management at 1:25am. For the test, the U.S. solar wings will be feathered at ~5:30pm, i.e., by locking the port and starboard SARJ (Solar Alpha Rotary Joint) at 0 deg, with post-test reset at ~8:00pm. [*The ASN will be required for proximity operations and docking approach of the European ATV-1 (Automated Transfer Vehicle 1) "Jules Verne" to the SM aft end, currently planned for early March 2008. The ground-controlled testing simulates the ATV rendezvous phase using the ASN system, and its results will be used to assess the ASN-M equipment's readiness for joint ATV operations.*]

*Saturday Science Preview:* Five optional activities for the voluntary “Saturday Science” program on the next weekend (9/8-9) were suggested to Clay for his choice. His selection is required by tonight. [The five choices are (1) Voice & video of another run of CFE VG1 (Capillary Flow Experiment – Vane Gap 1) to complete the CFE-VG1 experiment, (2) SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites), flying two & three satellites, requiring CDRA (CO<sub>2</sub> Removal Assembly) to be running, (3) BCAT-3 (Binary Colloidal Alloy Test-3) Magnet Unstick, using the CGBA-4 (Commercial Generic Bioprocessing Apparatus 4), powered up 12 hrs before, (4) SAME (Smoke Aerosol Measurement Experiment) final configuration, with leak tests on vacuum and nitrogen connections between SAME and MSG, installation of the first sample carousel & alcohol wick, and systems checkout plus first SAME science run initiated by the ground, and (5) EPO (Educational Payload Operation) Kit C Plant Growth experiment, voice and video.]

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:19am EDT [= epoch]):

Mean altitude -- 340.3 km

Apogee height -- 345.8 km

Perigee height -- 334.7 km

Period -- 91.34 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0008257

Solar Beta Angle -- -41.0 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 119 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50329

**Significant Events Ahead** (all dates Eastern and **subject to change**):

09/19/07 -- Progress M-60/25P undocking (SM aft port)

09/24/07 -- ISS reboost (setting up for Soyuz launch & 10A rendezvous on FD3)

09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/04/07 -- 50 Years of Spaceflight (Sputnik 1)

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/13/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
03/03/08 -- ATV-1 docking (SM aft port)  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/26/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/28/08 -- STS-124/Discovery/1J docking  
05/??/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)

10/14/08 -- Soyuz TMA-13/17S launch

10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)

04/??/09 -- Six-person crew on ISS

04/15/09 -- Ares I-X Launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/03/07  
**Date:** Monday, September 03, 2007 12:46:38 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/03/07**

All ISS systems continue to function nominally, except those noted previously or below. *Labor Day Holiday – on the ground and in space. Underway: Week 20 of Increment 15.*

FE-1 Kotov performed a checkout of the pressure sensor (PVK-D) in the Russian PVK-1 "Chibis" pressure suit, stepping through ground instructions. *[The Chibis is a below-the-waist reduced-pressure device (ODNT; US: LBNP, lower body negative pressure), which provides gravity-simulating stress to the body's cardiovascular/circulatory system for re-establishing the body's orthostatic tolerance (e.g., the Gauer-Henry reflex) after long-duration stays in zero-G. The LBNP applies suction on the lower body in steps ranging from 10 to 60 mmHg, thereby exerting a functional loading roughly equivalent to 10-60 kg of force on the musculoskeletal system to test the body's adaptation to prolonged exposure to microgravity. Chibis is also used by cosmonauts as part of their conditioning preparatory to returning into gravity.]*

CDR Yurchikhin continued to support TsUP/Moscow in the ongoing two-week testing of the Russian ASN-M Satellite Navigation Equipment, first temporarily closing down the data collection & saving application on Laptop 3, then copying the accumulated data to a 128MB flash card for subsequent downlinking via OCA/S-band for ground processing, and later re-starting the application to continue collecting the raw ASN-M test data. *[The ASN will be required for proximity operations and docking approach of the European ATV-1 (Automated Transfer Vehicle 1) "Jules Verne" to the SM aft end, currently planned for early March 2008. The ground-controlled testing simulates the ATV rendezvous phase using the ASN system, and its results will be used to assess the ASN-M equipment's readiness for joint ATV operations.]*

FE-2 Anderson supported a ground-performed checkout on S-Band String 2 in LDR (Low Data Rate) which required a comm check with the crew to verify the LDR

Voice capability. *[S-Band String 2 was upgraded on 13A.1, but the LDR Voice capability has not been checked out yet. Once String 2 LDR checkout was complete, the ground was to configure back to HDR (High Data Rate) and swap to String 1 in HDR. The ground then performed an LDR checkout on String 1, afterwards swapping back to String 2 and deactivating String 1.]*

Oleg Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including ASU toilet facilities systems/replaceables.

Anderson completed the periodic deployment of two passive FMK (formaldehyde monitoring kit) sampling assemblies in the Lab (below CEVIS) and SM (most forward handrail), to catch any atmospheric formaldehyde on a collector substrate for subsequent analysis on the ground.

Clay also continued his daily servicing of the EPO (Educational Program Operation) "Kit C" project, today by checking the growth chamber for humidity. *[The demo/experiment studies the growth of basil and lettuce in zero-G, in support of an Engineering Design Challenge for K-12 students of all abilities. During the 20-day run, Clay takes still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants will be watered on all odd numbered days. To determine if the plants need water, Clay looks in a viewport to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation, it'll be crew's choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

The crewmembers completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2) and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, the FE-2 will download the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off the Russian discretionary "time permitting" task list, Yurchikhin conducted the bi-weekly inspection of the space behind panels 406-420 in the SM where components of the condensate processing equipment are located, e.g., the BP pump (BP) and the GZhS air/liquid separator unit.

Also from the task list, the FE-1 performed the regular checkup on the Japanese

experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

An additional voluntary job from the Russian “job jar” for Oleg was the regular health check on the long-term BIO-5 Rasteniya-1 (“Plants-1”) micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

For the Russian crewmembers, TsUP/Moscow also has designated two recurring tasks as “get-ahead” jobs, to be hard-scheduled at a later time: (1) an audit/inspection behind stowage panels in the Russian segment (RS) of the ISS, to assess available stowage room, and (2) to continue shooting photo/video footage of the RS modules’ interiors.

*Saturday Science Preview:* Five optional activities for the voluntary “Saturday Science” program on the next weekend (9/8-9) were suggested to Clay for his choice. His selection is required by tomorrow night. *[The five choices are (1) Voice & video of another run of CFE VG1 (Capillary Flow Experiment – Vane Gap 1) to complete the CFE-VG1 experiment, (2) SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites), flying two & three satellites, requiring CDRA (CO<sub>2</sub> Removal Assembly) to be running, (3) BCAT-3 (Binary Colloidal Alloy Test-3) Magnet Unstick, using the CGBA-4 (Commercial Generic Bioprocessing Apparatus 4), powered up 12 hrs before, (4) SAME (Smoke Aerosol Measurement Experiment) final configuration, with leak tests on vacuum and nitrogen connections between SAME and MSG, installation of the first sample carousel & alcohol wick, and systems checkout plus first SAME science run initiated by the ground, and (5) EPO (Educational Payload Operation) Kit C Plant Growth experiment, voice and video.]*

*CDRA Run:* Early tomorrow morning (~12:20am EDT), the ground will deactivate the U.S. CDRA (Carbon Dioxide Removal Assembly), running over the weekend for SPHERES payload ops. VOA (Volatile Organics Analyzer) will be powered on at 1:45am.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are

downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:01am EDT [= epoch]*):

Mean altitude -- 340.4 km  
Apogee height -- 345.9 km  
Perigee height -- 334.9 km  
Period -- 91.34 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0008164  
Solar Beta Angle -- -42.4 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.76  
Mean altitude loss in the last 24 hours -- 85 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 50313

**Significant Events Ahead** (*all dates Eastern and **subject to change***):

09/04/07 -- Attitude Maneuver for ASN Testing (for ATV-1); probably requires SAW feathering;  
09/19/07 -- Progress M-60/25P undocking (SM aft port)  
09/24/07 -- ISS reboost (setting up for Soyuz launch & 10A rendezvous on FD3)  
09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/04/07 -- 50 Years of Spaceflight (Sputnik 1)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/13/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

02/06/08 – Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
03/03/08 -- ATV-1 docking (SM aft port)  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/26/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/28/08 -- STS-124/Discovery/1J docking  
05/??/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- Six-person crew on ISS  
04/15/09 -- Ares I-X Launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/02/07  
**Date:** Sunday, September 02, 2007 1:41:40 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 09/02/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for the crew except for housekeeping and voluntary work. Ahead: Week 20 of Increment 15.*

FE-1 Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including ASU toilet facilities systems/replaceables plus the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Kotov also gathered weekly data on total operating time & "On" durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

In support of the activation of the CDRA (Carbon Dioxide Removal Assembly) by ground command at ~2:35pm EDT, FE-2 Anderson connected the ITCS LTL QD (Internal Thermal Control System Low Temperature Loop Quick Disconnect) jumper for the required cooling.

Clay will also provide the daily servicing of the EPO (Educational Program Operation) "Kit C" project, today by taking photos to document the plant growth in zero-G. *[The demo/experiment studies the growth of basil and lettuce in zero-G, in support of an Engineering Design Challenge for K-12 students of all abilities. During the 20-day run, Clay takes still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants will be watered on all odd numbered days. To determine if the plants need water, Clay looks in a viewport to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation, it'll be crew's choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

The crewmembers are completing their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2) and VELO cycle with bungee cord load trainer (CDR, FE-1).

Working from the Russian discretionary "time permitting" job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second voluntary job for Oleg Kotov was another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Sony DSR PD-150P camcorder to obtain imagery of color bloom and cloud pattern anomalies from SM window #7. *[Photo targets were the Atlantic along the track, with Newfoundland Island, the South coast of the Bay of Biscay, the Gulf of Saint Lawrence, the Gulf of Guinea, the US coast and the Sargasso Sea.]*

Also as one of the voluntary tasks for today, CDR Yurchikhin performed another session of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature. *[Today's Uragan photo targets were the Kursk Steppe, the Volga river delta, the Aral Sea, Pamir mountains, glaciers to the west of Fedchenko glacier, the Crimea, wild fires, the Black Sea coast, the Mzymta river valley from Adler to its upper reach and the future site of Olympic village near the airport and to the south.]*

At ~6:25am EDT, Fyodor had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop).

*SKV-1 Checkout:* TsUP-Moscow is running a remote checkout of the SKV-1 air conditioner, after which the ISS will go back to SKV-2 as prime for the month of September.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:58am EDT [= epoch]*):

Mean altitude -- 340.5 km

Apogee height -- 346.1 km

Perigee height -- 334.8 km

Period -- 91.34 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008438

Solar Beta Angle -- -43.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 62 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50298

**Significant Events Ahead** (*all dates Eastern and **subject to change***):

09/03/07 -- Labor Day Holiday

09/04/07 -- Attitude Maneuver for ASN Testing (for ATV-1); probably requires SAW feathering;

09/19/07 -- Progress M-60/25P undocking (SM aft port)

09/24/07 -- ISS reboost (setting up for Soyuz launch & 10A rendezvous on FD3)

09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/04/07 -- 50 Years of Spaceflight (Sputnik 1)

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/13/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis/1E undocking

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

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01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

02/06/08 -- Progress M-62/27P undocking

02/07/08 -- Progress M-63/28P launch  
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02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
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02/27/08 -- STS-123/Endeavour/1J/A undocking  
03/03/08 -- ATV-1 docking (SM aft port)  
04/08/08 -- Soyuz TMA-12/16S launch  
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04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
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10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- Six-person crew on ISS  
04/15/09 -- Ares I-X Launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 09/01/07  
**Date:** Saturday, September 01, 2007 7:59:16 PM  
**Attachments:**

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### **ISS On-Orbit Status 09/01/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- off-duty day for the crew except for housekeeping and voluntary work. Flight Control to crew: "Enjoy your long weekend. It is very well deserved!"*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, Yurchikhin and Kotov performed preventive maintenance cleaning on the VPkhO, VdPrK & VPrK grilles plus V3 fan in the DC1 (Docking Compartment).

At ~9:10am EDT, the crewmembers held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

After lunch (~9:40am), FE-2 Anderson filled out the regular FFQ (Food Frequency Questionnaire), his ninth, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

The FE-1 conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

After a familiarization session with the new MSG-SAME (Smoke Aerosol Measurement Experiment) research investigation, Clay Anderson powered up the MSG (Microgravity Science Glovebox), set up the video gear, installed the bigger pieces of hardware and made the electrical connections; the remaining hardware will be installed at the next session. *[SAME creates smoke from common spacecraft materials in micro-G and then measures three of the most significant aspects of the resulting aerosol: (1) the number count density, (2) the collective, summed diameter of the particles, and (3) the mass density. The responses of the smoke detectors currently in use on the Shuttle and the ISS will also be measured. The data will be used to verify a mathematical model that has been developed to predict the size, density and concentration of these and other materials in a similar environment as well as providing specific, empirical design criteria for the development of the next generation of space-based smoke detectors. SAME components in the MSG WV (Work Volume) include two mounting plates (Diagnostics Mounting Plate & Experiment Support Plate), Fluids Control Unit, Data Acquisition & Control Unit, Aging Chamber, Sample Carousel, cables, connectors, etc.]*

The FE-2 also continued the daily servicing of the EPO (Educational Program Operation) "Kit C" project, today by checking the growth chamber for humidity.

CDR Yurchikhin continued to support TsUP/Moscow in the ongoing two-week testing of the Russian ASN-M Satellite Navigation Equipment, first temporarily closing down the data collection & saving application on the laptop, then copying the accumulated raw data to a 128MB flash card for subsequent downlinking during RGS (Russian Ground Site) passes for ground processing, and later re-starting the application to continue collecting the raw ASN-M test data. *[The ASN will be required for proximity operations and docking approach of the European ATV-1 (Automated Transfer Vehicle 1) "Jules Verne" to the SM aft end, currently planned for early March 2008. The ground-controlled testing simulates the ATV rendezvous phase using the ASN system, and its results will be used to assess the ASN-M equipment's readiness for joint ATV operations.]*

The crewmembers completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2) and VELO cycle with bungee cord load trainer (CDR, FE-1).

Afterwards, the FE-2 downloaded the crew's exercise data file to the MEC (Medical

Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary "time permitting" job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second voluntary job for Kotov was to use the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

As a third discretionary task on his list, Oleg performed the regular health check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

Also as one of the voluntary tasks for today, Fyodor Yurchikhin performed another session of the Uragan Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature. *[Today's Uragan photo targets were Taiwan, the Ugra National Park (Kaluga), the Northern section of the Aral Sea, and Lake Issyk-Kul.]*

At ~12:35pm EDT, Clay had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop).

*GPS-2 Anomaly:* Late on 8/30, SIGI-2 (Space Integrated Global Positioning Satellite/Inertial Navigation Systems 1) failed its time difference check. Software upgrade R3 was thought to have fixed this recurring failure which was recently also seen on GPS-1, which is still on R2 (*ref. 8/25 report*). As a result, there is currently no redundancy for vehicle state vector updates; but other sources of state determination (GPS-1 & Russian data) are available.

*KOB-2 Heating Loop Pump Failure:* The N1 pump on pump panel 4SPN1 of the Russian KOB-2 heating loop was declared failed (*ref. 8/30 report*). There is no

spare on board. The KOB-2 loop is running nominally on the 4SPN2 pump panel.

*RPCM R&Rs*: Ground specialists are considered removal & replacement of three USOS RPCMs (Remote Power Control Modules), keeping a fourth as new spare.

### **Weekly Science Update** (*Expedition Fifteen -- 18<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS)*: On 8/28, ALTCRISS instrument was reoriented (on SM panel 326); photos were taken of new configuration and downlinked; PCMCIA card was exchanged. On 8/29, the file size was checked and appears nominal. Data were downlinked for analysis.

*ANITA*: Planned.

*BCAT (Binary Colloidal Alloy Test)*: Reserve.

*CARDIOCOG-2*: Last session was performed yesterday (8/31).

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS)*: Continuing,

*CFE (Capillary Flow Experiment)*: Reserve.

*CHROMOSOME-2 (E14 SFP)*: Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus)*: Complete.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2)*: Powered off.

*EarthKAM (Earth Knowledge Acquired by Middle School Students)*: Next scheduled operation is 10/29-11/3.

*EMCH (Elastic Memory Composite Hinge)*: Complete.

*EPO (Educational Payload Operation) Kit C*: Planned.

*IMMUNO (Saliva Sampling)*: First session samples are currently stowed in MELFI Dewar #2.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*: Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* MULTIGEN-1 hydration completed and rotor spin initiated on 8/25. On 8/30, germination in all 8 ECs (Experiment Containers) observed. From 8/28, a problem occurred on humidity control for one EC (position A2) which has effect on EC air ventilation. Work-around with uplinked script to restart humidity control has been put in place. Relative humidity increased in 6 of 8 ECs (all except A2 and B1) from 50% to 80% on 8/29. EC B1 is in bypass mode since 8/29. Impact on science as no airflow through the EC volume. Issue is under investigation.

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* Planned.

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION:* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*SAMPLE:* Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* n/a

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* In progress.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Planned.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 8/28 the ground has received a total of 11,507 CEO images for review and cataloging for Increment 15, nearly a thousand images in the past two days. In this set the ground has identified for prioritized review images with camera times corresponding to the following CEO target request times: Licancabur, Volcano, Chile; Eastern Tien Shan, China; Nile River

Delta, Egypt; High Central Andean Glaciers; Urumqi, China; and Yellowstone National Park, Wyoming. *“Although we failed to help you acquire the glaciers of the Tien Shan, you did acquire excellent imagery of several of the ones in the High Central Andean Glacier site. These are now some of the best we have for these features. We will be providing feedback next week on the other targets as we catalog their imagery. Your spectacular image of the Shiveluch Volcano on the Kamchatka Peninsula acquired in July will be published on NASA/GSFC’s Earth Observatory website this weekend.”*

Today’s CEO (Crew Earth Observation) photo targets were **Wild fires, Algeria** (*DYNAMIC EVENT: Many wild fires are now raging on the wooded, sea-facing slopes of the Atlas Mts. Smoke is so thick that coastal towns are often obscured. Looking left of track for panoramic views*), **Tigris-Euphrates Delta** (*crew was asked to shoot a mapping pass left and right of track as they crossed the coast. The delta has been changing shape rapidly, partly as a result of marshland draining immediately upstream in the last two decades*), and **Toshka Lakes, Egypt** (*several new lakes have appeared in the desert west of the River Nile in the wake of government efforts to relocate population to southern Egypt. Looking right of track to document the latest status of these lakes whose levels appear to be dropping (after many years of continuous rise).*

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:49am EDT [= epoch]*):

Mean altitude -- 340.5 km

Apogee height -- 346.1 km

Perigee height -- 334.9 km

Period -- 91.35 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008339

Solar Beta Angle -- -43.3 deg (magnitude leveling off)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 48 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50282

**Significant Events Ahead** (*all dates Eastern and **subject to change***):

09/03/07 -- Labor Day Holiday

09/04/07 -- Attitude Maneuver for ASN Testing (for ATV-1); probably requires SAW feathering;  
09/19/07 -- Progress M-60/25P undocking (SM aft port)  
09/24/07 -- ISS reboost (setting up for Soyuz launch & 10A rendezvous on FD3)  
09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/04/07 -- 50 Years of Spaceflight (Sputnik 1)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/13/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
03/03/08 -- ATV-1 docking (SM aft port)  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/26/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/28/08 -- STS-124/Discovery/1J docking  
05/??/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)

08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/??/09 -- Six-person crew on ISS  
04/15/09 -- Ares I-X Launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/31/07  
**Date:** Friday, August 31, 2007 3:02:16 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/31/07**

All ISS systems continue to function nominally, except those noted previously or below. Flight Control to station crew: "Awesome job moving and reattaching PMA3 yesterday!"

Fifth (and last) day of the week-long activities dealing with PMA-3 (Pressurized Mating Adapter 3) relocation from the Node 1 (Unity) port CBM (Common Berthing Module) to the Node nadir (earth-pointing) CBM to make room for the installation of Node 2 (Harmony) arriving with STS-120/10A in October (10/25). In Node 1 (Unity), FE-2 Anderson –

- Cleaned up by restowing cargo bags and reconfiguring stowage to keep the port hatch clear for access to Node 2 (Harmony) after 10A;
- Started moving numerous CWCs (Contingency Water Containers), stowed up to now as a "water wall" on the Node's portside, and worked on rebuilding the entire water wall at another Node location (NOD1D2);
- Reconfigured UOPs (Utility Outlet Panels), with CBCS (Centerline Berthing Camera System) removed, by reconnecting cables for an IWIS RSU (Internal Wireless Instrumentation System Remote Sensor Unit), a vacuum cleaner, and SSC-9 (Station Support Computer 9);
- Reconfigured the electrical CPP (Connector Patch Panel) to have the Node power bus be fed from a DDCU (DC-to-DC Converter Unit) instead RACU 6 (Russian-to-American Converter Unit), i.e., all of Node 1 now being run on U. S. power; and
- Used a handheld CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) instrument to measure the O<sub>2</sub> percentage behind the closeout panel that was opened in the Node.

With the Elektron oxygen (O<sub>2</sub>) generator switched off, then purged with N<sub>2</sub> (nitrogen) on TsUP/Moscow Go-ahead, FE-1 Kotov performed maintenance on the

BITS2-12 Onboard Telemetry Measurement System's prime Central Processor system (PTsB), removing and replacing its PZU-A data storage unit (ROM-A = read-only memory A) with a new spare. [The subsystem's PZU-A memory unit was replaced last by Mikhail Tyurin on 3/14/07.]

Afterwards, the FE-1 supported the ground in reactivating the Elektron at 32 amps, monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. [During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]

After Clay's CPP patch panel reconfiguration, Oleg Kotov updated SODS (Station Operation Data File) Emergency Book procedures accordingly.

CDR Yurchikhin set up the pumping equipment for transferring potable water from Progress M-61/26P's BV1 tank to the Service Module (SM) water BV1 tank. [After hooking up the plumbing from BV1 to the SM Rodnik tank, Yurchikhin monitored the water transfer to the BV1 for several hours, at first in self-flow (under its own tank pressure), then using a compressor pump via a GZhS gas/liquid separator, to remove air bubbles in the water. Before its use, the GZhS was flushed for cleaning. Filling of the empty Progress BV1 & BV2 tanks with urine will be scheduled at a later date.]

Oleg Kotov had two hours allotted to unstow & set up the equipment for a closeout session with the BTC-10 CARDIOCOG experiment and then to perform the procedure on himself. [CARDIOCOG studies changes in the human cardiovascular system in micro-G, expressed in the peripheral arteries, and the vegetative regulation of arterial blood pressure (BP) and heart rate (HR) plus ECG (electrocardiogram). For the experiment, Oleg had to take his systolic & diastolic blood pressure measurements, heart rate data and ECG, using a finger cuff, the Cardionauka CAR 01 kit with PTP-10 Portapress power, an electrode vest, and the TENZOPLUS sphygmomanometer. He then stored the data on the RSE1 laptop for subsequent copying to a PCMCIA card and downlinking to the ground via OCA. The hardware was temporarily put aside.]

After Anderson prepared the auditory test equipment, each crewmember took the periodic O-OHA (on-orbit hearing assessment) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC laptop application. It was Fyodor's and Oleg's second, Clay's first session. [The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and

sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month. Note: There have been temporary hearing deficits documented on some U.S. and Russian crewmembers, all of which recovered to pre-mission levels.]

After the recent (8/8) replacement of the malfunctioning Russian Smart Switch Router (BRI) in the joint OpsLAN (Operations Local Area Network) with a new unit delivered on Progress 26P and the subsequent full-scale network testing on 8/9, Yurchikhin today routed and installed an Ethernet cable between the BRI and an MPEC Coder unit in the Russian Segment (RS). [During the installation, the BRI had to be deactivated, which temporarily interrupted all communications between U. S. Segment (USOS) and RS OpsLAN components. After BRI activation, the installation was tested by “pinging” (with the RSC-Energia PingMaster) while monitoring the network.]

The FE-1 performed the weekly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), checking the condition of the roller bearings and recording the treadmill’s time & date values.

The CDR conducted the periodic (every two weeks) inspection of the RED (Resistive Exercise Device) with canister cords and accessory straps as well as the canister bolts for re-tightening if required.

Yurchikhin also continued the current round of the monthly preventive maintenance of RS ventilation systems, today working in the Funktsionalnyi-Grusovoi Blok (FGB) to clean the mesh screens of its central ventilation fans (TsV1 & TsV2), followed by cleaning the detachable fan screens 1, 2, and 3 of its three SOTR (thermal control system) gas-liquid heat exchangers (GZhT4).

Clay Anderson continued supporting the EPO (Educational Program Operation) “Kit C” project, today by taking photos to document the plant growth in zero-G. [The demo/experiment studies the growth of basil and lettuce in zero-G, in support of an Engineering Design Challenge for K-12 students of all abilities. During the 20-day run, Clay takes still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants will be watered on all odd numbered days. To determine if the plants need water, Clay looks in a viewport to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation,

it'll be crew's choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]

The FE-2 completed the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. [Purpose of the 10-min. activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements. Two CSA-CP (CSA-Combustion Products) instruments recorded O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post (#1060, prime) and in the Node (#1057, backup), while the CSA-O<sub>2</sub> units (#1063, #1042) looked for O<sub>2</sub> in the Lab and the CDMK (#1008) for CO<sub>2</sub> in SM and Lab. Also recorded were battery ticks. The instruments were turned off afterwards, except for the prime CSA-CP #1060 unit, and returned to their regular locations. Note: Clay Anderson today suggested doing this trending check every two weeks instead of weekly. Under review.]

Clay also performed the regular bi-weekly maintenance reboot of the SSC (Station Support Computer) File Server and OCA Comm Router laptops.

Fyodor performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Working on updating the IMS (Inventory Management System), Clay edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Oleg performed troubleshooting on the Russian long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, which has shown indications of off-nominal equipment operation. [The FE-1 modified laptop settings to change the humidity levels in the cells of the Lada-10/MIS (Module for the Investigation of Substrates).]

The crewmembers completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2) and RED resistive exerciser (CDR, FE-1, FE-2).

Later tonight, the FE-2 downloads the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM

storage medium (done six times a week).

Working from the Russian discretionary “time permitting” job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). [This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]

Conjunction Update: MCC-H ballistics specialists have been monitoring a conjunction with orbital debris (old Russian Strela ICBM body, NATO designation: SS-11 Sego), with TCA (time of closest approach) tonight at ~7:00pm EDT. Current predictions continue to show a miss distance of ~29.3 km. No DAM (Debris Avoidance Maneuver) required.

At ~4:15am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~9:10am, Fyodor and Oleg linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. [Discussions today concerned the location of the discarded ASU collector, condition of a transferred light unit from the recent lamp audit, and state of completion of the Russian photo/video equipment audit/inventory.]

At ~10:30am, Fyodor and Oleg participated an audio/S-band interview with a correspondent from the Russian “Rossiyskiy Kosmos” magazine. [Main topic was the upcoming 50<sup>th</sup> Anniversary of the launch of the first Earth satellite on 10/4/57 which the cosmonauts are to spend on the station.]

The crew’s regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio was conducted at ~10:45am.

Today’s CEO (Crew Earth Observation) photo targets were **Tin Bider Impact Crater, Algeria** (this 6 km-diameter crater is known to be less than 70 million years old from the age of the rocks that it has impacted. Looking left for a prominent dark mass sandwiched between classic desert landscapes [wind streaks produced by strong southwesterly winds, and a megafan produced by a river exiting mountains in the foreground]. Relatively low sun angles should have revealed detailed morphology of this remote Saharan crater), **Urumqi, China** (looking left at the foot of the local mountains for this city), **Taklimakan Desert Dust, China** (DYNAMIC EVENT: Looking right for a regional dust storm, with dust blowing towards ISS ground track. Crew was asked to include surrounding mountain slopes in any

images. Winds regularly blow dust from this desert basin as far as Beijing and Japan), and **Yellowstone National Park, Wyoming** (a mapping swath of overlapping images, taken along track just left of nadir, was requested).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

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Revolutions since FGB/Zarya launch (Nov. 98) -- 50266

**Significant Events Ahead** (all dates Eastern and **subject to change**):

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09/04/07 -- Attitude Maneuver for ASN Testing (for ATV-1); probably requires SAW feathering;

09/19/07 -- Progress M-60/25P undocking (SM aft port)

09/24/07 -- ISS reboost (setting up for Soyuz launch & 10A rendezvous on FD3)

09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/04/07 -- 50 Years of Spaceflight (Sputnik 1)

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5

10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/13/07 -- US EVA-10

11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
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02/09/08 -- Progress M-63/28P docking  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
03/03/08 -- ATV-1 docking (SM aft port)  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/26/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/28/08 -- STS-124/Discovery/1J docking  
05/??/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
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09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch -- MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
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04/15/09 -- Ares I-X Launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/30/07  
**Date:** Thursday, August 30, 2007 3:07:27 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/30/07**

All ISS systems continue to function nominally, except those noted previously or below.

**PMA-3 is now fully mated at the Node nadir docking port, and the port dock is ready to receive Node 2 (Harmony).**

This was Day 4 of the week-long activities dealing with PMA-3 (Pressurized Mating Adapter 3) relocation from the Node 1 (Unity) port CBM (Common Berthing Module) to the Node nadir (earth-pointing) CBM to make room for the installation of Node 2 (Harmony) arriving with STS-120/10A in October (10/25):

- FE-2 Anderson, having verified proper closure of the protective Lab window shutter, checked on completion of the overnight PMA depressurization (to less than 2 mmHg for demating to proceed) and conducted a 30-min leak check.
- At ~5:35am EDT, flight controllers disabled the Russian thrusters for the duration of SSRMS (Space Station Remote Manipulator System) and CBM (Common Berthing Mechanism) operations (with safing and recovery procedures in place in case of an unlikely LoAC/Loss of Attitude Control event); next
- The FE-2 powered on the CBCS (Centerline Berthing Camera System) on the Node nadir hatch window;
- Anderson and Kotov then grappled PMA-3 with the SSRMS, as Yurchikhin initiated demate activities, i.e., worked with the CBM bolt mechanism;
- Demate ops were stopped for a while by a problem with two fault-indicating bolts (RBOLT #2-1, #2-4), and a third bolt (#3-4) showing intermittent failure. The faults were identified as a sensor issue of the bolts' force load cells for measuring the torque applied (seen before, i.e.,

nothing physically wrong with the CBM mechanism). Since the known bolt-driving motor currents are also quantitative torque indicators, demating proceeded. More in-depth analysis work, already underway, to be performed before the planned temporary attachment of Node 2 to the port CBM on 10A).

- After nadir CBM was reconfigured by the ground, Clay and Oleg continued to maneuver PMA-3 through a quarter circle around the Node to the nadir port while Fyodor performed pre-mate verification on its CBM; then
  - PMA-3 was successfully installed, with Fyodor completing first & second stage capture and subsequent ABOLT driving. Afterwards
  - Clay and Oleg ungrappled the SSRMS from PMA-3 and maneuvered it to a stow position.
  - Next, after finishing ABOLT loading from the ground, controllers deactivated & powered down the nadir CBM, then temporarily re-activated the port CBM, long enough for Fyodor to close its petals.
  - At ~12:10pm, ground controllers re-enabled thruster control, while
  - Clay reconfigured the SSRMS video setup, disconnecting the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable at the Cupola & Lab RWS (Robotics Work Station).
  - The FE-2 then disassembled and restowed the CBCS, and
  - Concluded activities by re-latching the Node 1 nadir hatch.

As part of regular maintenance of the Service Module (SM) water processing system, Oleg Kotov swapped the BRPK-1 (string-1 Air/Liquid Separation & Pumping Unit) of the SRVK-2M Condensate Water Processor with a spare unit, discarding the old unit for disposal. *[The SRVK processes the condensate coming from the SKV air conditioner for the Elektron.]*

CDR Yurchikhin continued to support TsUP/Moscow in the two-week testing of the Russian ASN-M Satellite Navigation Equipment, first temporarily closing down the data collection & saving application on the laptop, then copying the accumulated data to a PCMCIA (Portable Computer Memory Card International Adapter) CF 128MB storage card for subsequent downlinking during RGS (Russian Ground Site) passes for ground processing, and later re-starting the application to continue collecting the raw ASN-M test data. *[The ASN will be required for proximity operations and docking approach of the European ATV-1 (Automated Transfer Vehicle 1) "Jules Verne" to the SM aft end, currently planned for early March 2008. The ground-controlled testing simulates the ATV rendezvous phase using the ASN system, and its results will be used to assess the ASN-M equipment's readiness for joint ATV operations.]*

Yurchikhin also performed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water collected in CWC (Contingency Water Container) #1077 from the Lab CCAA (Common Cabin Air Assembly) dehumidifier. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

FE-2 Anderson updated the onboard SODF (Station Operation Data File) "Emergency" procedures books with new pages and pen & ink changes, both for the four EMER-1 books normally stowed in Lab, FGB, SM and Soyuz, and the three EMER-2 books from Lab, FGB and SM.

Clay continued preparing the MELFI (Minus-Eighty Laboratory Freezer for ISS) for future use, started by Oleg yesterday, removing Velcro straps from Dewar 3/Tray D (sections 1&2). *[The straps were used as launch restraints for new ICEPACs. They were reported by Suni Williams to have obstructed Icepac insertion and removal unless taken off beforehand. Each Dewar should not be opened for more than ~1 minute, requiring quick work.]*

Fyodor performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Working to update the IMS (Inventory Management System), Oleg edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Clay conducted the weekly 10-min. CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card, to be updated with today's data, lists 31 water containers (~1190 liters total) for the four types of water identified on board: technical water (806.9 l, for Elektron, flushing, hygiene), potable water (351.2 l), condensate water (13.2 l), waste/EMU dump and other (19.0 l.)]*

As part of the current round of periodic preventive maintenance of Russian Segment (RS) ventilation systems, the CDR worked in the FGB to clean the vent screens of specific interior closeout panels (116, 231, 316, 431, 201, 301 & 401).

Clay continued supporting the EPO (Educational Program Operation) "Kit C" project, today by checking the growth chamber for humidity. *[The demo/experiment studies the growth of basil and lettuce in zero-G, in support of an Engineering Design Challenge for K-12 students of all abilities. During the 20-day*

*run, Clay takes still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants will be watered on all odd numbered days. To determine if the plants need water, Clay looks in a viewport to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation, it'll be crew's choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-1, FE-2), and VELO cycle with bungee cord load trainer (CDR).

Later tonight, the FE-2 downloads the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At 12:20pm, FE-2 Williams conducted the periodic VHF1 emergency communications check over NASA's VHF (Very High Frequency) sites at Dryden (12:23-12:30pm), White Sands (12:25-12:32pm) and Wallops Island (12:33-12:37pm), talking with Houston/Capcom, MSFC/PAYCOM (Payload Operation & Integration Center Communicator) and Moscow/GLAVNI (TsUP Capcom) in the normal fashion via VHF radio from a handheld microphone and any of the U.S. segment ATUs (audio terminal units). *[Purpose of the test is to verify signal reception and link integrity, and to ensure minimum required link margin during emergency (no TDRS) and special events (such as a Soyuz relocation).]*

Working from the Russian discretionary "time permitting" job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

Also as a task from the voluntary job list, Oleg performed the regular health check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

*Conjunction advisory:* MCC-H ballistics specialists are monitoring a conjunction

with orbital debris (old Russian Strela ICBM body, NATO designation: SS-11 Sego), with TCA (time of closest approach) tomorrow evening at ~7:00pm EDT. Current predictions show a miss distance of ~29.3 km. No DAM (Debris Avoidance Maneuver) considered.

*SKV-2 Update:* The Russian SKV-2 air conditioner experienced an off-nominal shutdown yesterday due to an unplanned automatic switchover from pump panel 4SPN1 to pump panel 4SPN2 on the KOB-2 heating loop. The KOB-2 loop was restarted on 4SPN2 and SKV-2 subsequently reactivated. It is now back on and operating nominally.

*EVA Glove Damage Update:* Ground inspection has now determined that the hole in the Vectran layer of Rick Mastracchio's EMU glove was not caused by abrasion but is a cut caused by a sharp edge (these gloves were not the same lot as the glove damaged/cut on Curbeam's 12A.1 EVA). Teams are assessing work site areas to try to isolate the source and are attempting to manifest additional sets of gloves for any crewmembers doing an EVA on 10A. The current terminate criteria for an EVA will remain as is. A program review will be performed prior to giving a GO for an EVA in this worksite area.

Today's CEO (Crew Earth Observation) photo targets were **Tenoumer Impact Crater, Mauritania** (*looking left of track [beyond a dark, linear ridge in the foreground] for this 2 km-diameter crater which is young and well-formed. An ejecta blanket can be discerned around the crater*), **Bigach Impact Crater, Russia** (*aiming at nadir for this 8-km-diameter crater. The visual cue is Lake Zaysan just downtrack, and a group of agricultural fields that lie within the crater rim*), and **Andrews Forest, Washington** (*looking left of track for this mountain forest and shooting a mapping swath. This is an LTER (Long Term Ecology Research) site in which rapid changes are occurring due to human activity. Repeat photography can help to document such change*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:07am EDT [= epoch]*):

Mean altitude -- 340.7 km

Apogee height – 346.3 km

Perigee height -- 335.0 km

Period -- 91.35 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0008401  
Solar Beta Angle -- -41.4 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.76  
Mean altitude loss in the last 24 hours -- 88 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 50250

**Significant Events Ahead** (*all dates Eastern and **subject to change***):

08/31/07 -- Clean-up after relocation, restow bags (enabling Node 2 access from Node 1);  
09/03/07 -- Labor Day Holiday  
09/04/07 -- Attitude Maneuver for ASN Testing (for ATV-1); may require SAW feathering;  
09/19/07 -- Progress M-60/25P undocking (SM aft port)  
09/24/07 -- ISS reboost (setting up for Soyuz launch & 10A rendezvous on FD3)  
09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/04/07 -- 50 Years of Spaceflight (Sputnik 1)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate from Z1 to P5  
10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)  
11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab  
11/13/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking

03/03/08 -- ATV-1 docking (SM aft port)  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/26/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/28/08 -- STS-124/Discovery/1J docking  
05/??/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)  
04/15/09 -- Ares I-X Launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 08/29/07  
**Date:** Wednesday, August 29, 2007 1:45:10 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/29/07**

All ISS systems continue to function nominally, except those noted previously or below.

Day 3 of the week-long activities dealing with PMA-3 (Pressurized Mating Adapter 3) relocation from the Node 1 (Unity) port CBM (Common Berthing Module) to the Node nadir (earth-pointing) CBM to make room for the installation of Node 2 (Harmony) arriving with STS-120/10A in October (10/25). Today, the crew took the following steps:

- FE-1 Kotov unlatched the Node 1 nadir hatch by taking the latch to its "hardstop" position (hatch remains sealed tight by 38,993 lbf of internal air pressure at 14.7 psi IVA); afterwards
- FE-2 Anderson set up the ISA (Internal Sampling Adapter) and VAJ (Vacuum Access Jumper), connecting it to the Node port MPEV (Manual Pressure Equalization Valve) in preparation for PMA depressurization; additionally
- Anderson installed the CBCS (Centerline Berthing Camera System) on the Node nadir hatch window, followed by a checkout.
- At ~2:15pm, the FE-2 will initiate depressurization of PMA-3, which will take place overnight (the original plan of performing the depress tomorrow morning was changed when new data showed that it will take several hours to get PMA pressure from currently ~20 mmHg down below 5 mmHg, as required).
- Also overnight, the ground will check out the two Node CBMs (port & nadir). In addition, the nadir CBM's petals will be deployed for an inspection of the ACBM (Active CBM) sealing surface with the SSRMS (Space Station Remote Manipulator System). *[A brief loss of the SSRMS Tip Elbow camera yesterday was quickly cleared by power cycling, restoring nominal ops.]*

Before breakfast and exercise, CDR Yurchikhin, FE-1 Kotov and FE-2 Anderson completed their second (Clay's first) session with the periodic Russian MedOps test

"Hematokrit" (MO-10), measuring red cell count of the blood. *[The blood samples were drawn from a finger with a perforator lancet, then centrifuged in two microcapillary tubes in the M-1100 kit's minicentrifuge, and its hematocrit value was read off the tubes with a magnifying glass. It is a well-known phenomenon of space flight that red blood cell count (normal range: 30-45%) tends to go down over time. After the exam, the data were saved in the IFEP software (In-Flight Examination Program) on the MEC (Medical Equipment Computer), and Oleg Kotov stowed the equipment.]*

Yurchikhin and Kotov also took the periodic (generally monthly) health test with the cardiological experiment PZEH MO-1 "Study of the Bioelectric Activity of the Heart at Rest" on the TVIS (Treadmill with Vibration Isolation System), assisting each other in turn. *[During the 30-min. test, the crew tagged up with ground specialists on Russian ground site (RGS) passes via VHF (~7:40am EDT) and downlinked data from the Gamma-1M ECG (electrocardiograph) for about 5-6 minutes.]*

Fyodor Yurchikhin serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system, deferred from yesterday. The regen process will be terminated at ~5:15pm EDT. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods. Filter bed 1 was regenerated last Monday.]*

Clay Anderson worked in the U.S. Airlock, removing and replacing its three HEPA (high-efficiency particulate air) bacteria filters with new ones. *[One of the old filters will be returned to the ground for analysis, the other two discarded as trash.]*

At the HRF1 (Human Research Facility 1) rack, Anderson deactivated the MedOps cardiac defibrillator and conducted its periodic checkout. (Last time done: 7/2/07). *[This routine maintenance task is scheduled as soon as possible from Expedition start and every 60 days thereafter. For the checkout, the defib is connected to the 120V outlet, equipped with its battery (today #1018) and then allowed to charge, for about five seconds, to a preset energy level (e.g., 100 joules). After the button-triggered discharge, a console indicator signals success or failure of the test. The pacing signal is downlinked via S-band for 1 min. To check on possible aging of the CRT (cathode ray tube) display screen, today's maintenance included photo documentation by Clay. The HRF was powered down afterwards.]*

Kotov prepared the MELFI (Minus-Eighty Laboratory Freezer for ISS) for future use, removing Velcro straps from Dewar 3/Tray D (sections 3&4). *[The straps were used as launch restraints for new Icepacs. They were reported by Suni Williams to have obstructed Icepac insertion and removal unless taken off beforehand.]*

Anderson worked on the MSG (Microgravity Science Glovebox), removing and stowing its WV (Work Volume) leak test equipment to make room for setting up the new SAME (Smoke & Aerosol Measurement Experiment) payload, intended to determine size and distribution of smoke particles from different materials inside the MSG WV.

TsUP/Moscow continues preps for the two-week testing of the Russian ASN-M Satellite Navigation Equipment. There was no crew involvement scheduled today. *[The ASN will be required for proximity operations and docking approach of the European ATV-1 (Automated Transfer Vehicle 1) "Jules Verne" to the SM (Service Module) aft end, currently planned for early March 2008. The ground-controlled testing simulates the ATV rendezvous phase using the ASN system, and its results will be used to assess the ASN-M equipment's readiness for joint ATV operations.]*

The FE-1 continued the current round of periodic preventive maintenance of Russian Segment (RS) ventilation systems, today cleaning Group A fans in the SM.

Kotov also performed an extensive audit/inventory of all lights (SD) in the RS and their plug-in data (SD1-7 power supply units), supported by an uplinked detailed listing of 42 deployed lamps and another 55 spare lamps in FGB stowage bags.

Yurchikhin had another 2h 45m set aside for Progress M-61/26P unloading and cargo transfers, keeping track of movements in the IMS (Inventory Management System).

The FE-2 reconfigured three Lab UOPs (Utility Outlet Panels, #1,2,5) in preparing for the upcoming routing/connecting of the ISL (Integrated Station LAN) Router and EWIS NCU (External Wireless Instrumentation System/Network Control Unit). *[ISL is an upgraded on-board LAN (local area network) utilizing Ethernet connectivity over an ISL Router via cable or wireless (WAP/Wireless Access Point). ISL integrates all ISS "user" devices, including RS docking video distribution, payload comm & downlink (from IP modules, e.g., Columbus or JEM), crew operations, procedures viewing, email, IP phone, etc. ISL eliminates drag-through cables in hatches, will be up to ten times faster than the current OpsLAN, and has provisions for future modules.]*

The crew conducted the regular fire drill/OBT (on-board training), a mandatory periodic one-hr exercise (including ground debrief conference). Primary goal of this Russian-led interactive exercise is to provide the station residents with the most realistic emergency training possible. The drill is always conducted with the support of both MCCs in close coordination. It should be performed every 2.5 months, but not later than 1 month prior to end of Increment. *[OBT objectives are to (a)*

*practice fire response procedures (FRPs) and all incorporated actions for the case of a software-detected fire to locate, extinguish, and verify extinguishing attempts; (b) browse through RS laptop and the Signal-VM fire detection system displays as well as the automated software (algorithms) response to the fire event; (c) practice crew communication necessary to perform emergency FRPs; (d) ensure familiarization with support equipment (CSA-CP compound specific analyzer-combustion products, PBAs portable breathing assemblies, PFE/OSP-4 portable fire extinguishers, and IPK-1M gas masks to be used for fire suppression. These exercises do not actually use any fire equipment but simulate such actions to the maximum extent possible. The Emergency Procedures OBT concluded with a 15-min. debrief with Russian/U.S. ground specialists at ~11:30am EDT via S-band.]*

The FE-2 opened the CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) payload, accessing the incubator's interior to perform the first set of CSI-02 (CGBA Science Insert #2) operations. Afterwards, CGBA-5 was closed again and cable-connected. *[Ops included removing & stowing the Silica Garden Hab, sowing seeds in the Plant Development Hab, and flipping the CHab and Cell Culture Hab. The incubator is controlled from the ground with automatic video downlinked to Earth.]*

Clay also continued supporting the EPO (Educational Program Operation) "Kit C" project, today by taking photos to document the plant growth in zero-G. *[Today's message to Clay: "The EPO Kit C images look good so far... We are working to put them up on the Engineering Design Challenge website. We have seen a good number of schools sign up already to participate in this challenge." The demo/experiment studies the growth of basil and lettuce in zero-G, in support of an Engineering Design Challenge for K-12 students of all abilities. During the 20-day run, Clay takes still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants will be watered on all odd numbered days. To determine if the plants need water, Clay looks in a viewport to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation, it'll be crew's choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

On the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), Yurchikhin removed the PCMCIA memory card #934 from the AST spectrometer's slot and copied the accumulated data for subsequent downlinking via OCA. Card 934 was then re-inserted to continue AST ops.

Oleg performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the periodic checkout/verification of IP-1 airflow sensors in the

various RS hatch openings (8) in the SM, FGB and DC1. *[On 8/27, the crew reported a problem with the ASU toilet facility, indicated on one of its two control panels. Troubleshooting showed that the separator was failing. The crew replaced it yesterday with a new spare (#29), which restored nominal operations.]*

Working to update the IMS, the CDR edited its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR/MO-1, FE-1/MO-1, FE-2), RED resistive exerciser (FE-1, FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Yurchikhin downloads the crew’s exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~5:50am EDT, Fyodor, Oleg and Clay downlinked a PAO TV “Space Lesson”, answering uplinked questions for a promotional event organized by “Rossiyskaya Gazeta”, a publication of the Russian government, for Russia’s “Days of Knowledge”. The event brings ISS cosmonauts, readers, high school students, school teachers and university professors together, with a competition for questions, the best to be rewarded with an invitation to TsUP-Moscow for a comm session. *[“To Fyodor Yurchikhin: You have a PhD in Economics. Is it possible to make space flights profitable? If yes, then how?”; “To Clayton Anderson: Now we have US Orbiters and Russian Soyuz vehicles flying to space. What are the best features of both which should be implemented in manned spacecraft of the future? And which features should be unequivocally abandoned?”; “To Oleg Kotov: You have been waiting 13 years until your space launch. Unfortunately, many of your colleagues in a similar situation got disheartened and gave up. What three pieces of advice would you give to those who decide to choose the difficult profession of a cosmonaut?”; “To all: Whom among famous people would you like to be your guest at ISS as a tourist?”; “Can cosmonauts coordinate a fire-fighting effort among specialists on the ground, for example, like now in Greece?”]*

At ~12:00pm, the FE-2 powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), and at 12:05pm conducted a radio exchange with students at Ashland Greenwood High School, Ashland, Nebraska (Clay’s home state). Ashland, pop. 2262, is located in SE Nebraska between Lincoln, the state capital, and Omaha. Questions from the kids were uplinked beforehand by the ARISS (Amateur Radio on International

Space Station) organization. [*“Did being in space make you nauseous at first?”; “How is physical activity affected while in space? Do you burn more calories? Do you have better stamina? How are your heart rate and blood pressure affected?”; “How well do you get along with the people you work with?”; “When you are on Earth and working with NASA, is it hard to maintain your personal life? Or is it like the military where you have no personal life?”*]

At ~4:10pm, Anderson is scheduled for a CDF (Crew Discretionary Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

Working from the Russian discretionary “time permitting” job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). [*This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.*]

Today’s CEO (Crew Earth Observation) photo targets were **Cairo, Egypt** (*looking a touch left of track at the base of the Nile delta, on the East bank of the Nile for this great city. Remote sensing is one of the best means of measuring the growth of rapidly expanding Third World cities. The crew was asked to shoot the margins of the city where it expands into farmland on the west side and into the desert on the east side*), and **Mediterranean wild fires** (*DYNAMIC EVENT: Looking left for smoke plumes emanating from the North coast of Sicily; immediately thereafter aiming right for fires and plumes in Greece.*)

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Apogee height – 346.3 km

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Eccentricity -- 0.0008196

Solar Beta Angle -- -39.5 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 118 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50234

**Significant Events Ahead** (*all dates Eastern and **subject to change***):

08/30/07 -- PMA-3 overnight depress & relocation (from Node 1 port to nadir, for Node 2 install);

08/31/07 -- Clean-up after relocation, restow bags (enabling Node 2 access);

09/03/07 -- Labor Day Holiday

09/04/07 -- Attitude Maneuver for ASN Testing (for ATV-1)

09/19/07 -- Progress M-60/25P undocking (SM aft port)

09/24/07 -- ISS reboost (setting up for Soyuz launch & 10A rendezvous on FD3)

09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/04/07 -- 50 Years of Spaceflight (Sputnik 1)

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

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10/25/07 -- STS-120/Discovery/10A docking (4 EVAs, incl. Node 2 & PMA-2 external preps)

11/03/07 -- STS-120/Discovery/10A undocking

11/06/07 -- PMA-2 relocation to Node 2 (PMA-2 umbilicals stowed on 10A EVA-4)

11/08/07 -- Node 2 (Harmony) plus PMA-2 relocation to front of Lab

11/13/07 -- US EVA-10

11/18/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis/1E undocking

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

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01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

02/06/08 -- Progress M-62/27P undocking

02/07/08 -- Progress M-63/28P launch

02/09/08 -- Progress M-63/28P docking

02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS

02/16/08 -- STS-123/Endeavour/1J/A docking

02/27/08 -- STS-123/Endeavour/1J/A undocking

03/03/08 -- ATV-1 docking (SM aft port)

04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)

04/26/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/28/08 -- STS-124/Discovery/1J docking  
05/??/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
05/04/08 -- STS-124/Discovery/1J undocking  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/28/07  
**Date:** Tuesday, August 28, 2007 1:47:28 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/28/07**

All ISS systems continue to function nominally, except those noted previously or below.

Day 2 of the week-long activities dealing with PMA-3 (Pressurized Mating Adapter 3) relocation from the Node 1 (Unity) portside CBM (Common Berthing Module) to the Node nadir (earth-pointing) CBM to make room for the installation of Node 2 (Harmony) arriving with STS-120/10A in October (10/25). Today, the crew took the following steps:

- FE-2 Anderson verified closure of the Lab window shutter prior to SSRMS (Space Station Remote Manipulator System) ops; since SSRMS will continuously be in the window's field of view, the window needs to be protected until the completion of SSRMS ops on 8/30); afterwards
- CDR Yurchikhin and FE-1 Kotov each had about an hour for familiarization with CBM (Common Berthing Module) operations by going through uplinked CBM CBT (Computer Based Training) material; additionally
- Anderson set up the ROBoT trainer and used it with Kotov to prepare for the SSRMS/Robotics ops [*ROBoT uses DOUG (Dynamic Operations Ubiquitous Graphics) software, a hand controller and two laptops (one for graphics, one for the simulation) for on-orbit training of MSS (Mobile Service System) and SSRMS (Space Station Remote Manipulator System) operations*]; and finally
- The FE-2 completed preparatory SSRMS set-up ops by releasing the PDGF-3 grapple fixture on the MBS (Mobile Base System) and maneuvering the robotarm's end effector to the Node 1 nadir CBM survey position.

Oleg Kotov serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The regen process will be terminated at ~4:05pm EDT. [*Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods. Filter bed 1 was regenerated*

*yesterday.]*

Also in the SM (Service Module), Yurchikhin worked at the prime TsP (Central Post) area, making a backup copy of the KTSP1/CPC1 (Central Post Computer 1) software load on an MSD (mass storage device) cartridge. *[For the activity, KTSP2 was activated and KTSP1 shut down. For the copying, KTSP1 was then activated from the ground, with disk formatting and data copying performed automatically. For removing the cartridge, KTSP1 was turned off by the ground and later re-activated, while KTSP2 was shut down.]*

With the Airlock (A/L) CCAA air conditioner running, Clay Anderson set up SCU (Service & Cooling Umbilical) gear for the standard EMU (Extravehicular Mobility Unit) "scrubbing" and then starting the ionic and particulate filtration process of the EMU and A/L cooling loops, for elimination of any biomaterial residues. Tonight before sleep time, Clay is to support CCAA (Common Cabin Air Assembly) deactivation by moving the flexible air duct from the Conditioned Air Supply position to the IMV (Intermodular Ventilation) Air Return position. *[The two spacesuits (#3006, #3008) required about one hour each with SCU connected.]*

The CDR continued to support TsUP/Moscow in the two-week testing of the Russian ASN-M Satellite Navigation Equipment, beginning today, by connecting the ASN-M DDC adapter to the RS (Russian Segment) Laptop #3 and starting the application for collecting the raw ASN-M test data and subsequent downlinking to the ground during RGS (Russian Ground Site) passes for processing. *[The ASN will be required for proximity operations and docking approach of the European ATV-1 (Automated Transfer Vehicle 1) "Jules Verne" to the SM aft end, currently planned for early March 2008. The ground-controlled testing simulates the ATV rendezvous phase using the ASN system, and its results will be used to assess the ASN-M equipment's readiness for joint ATV operations.]*

The FE-1 continued the current round of periodic preventive maintenance of RS ventilation systems. In the DC1 (Docking Compartment), he first cleaned the VD1 & VD2 air ducts.

Moving afterwards into the SM, Oleg replaced four dust filter cartridges (PF1-4).

Yurchikhin supported the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) by changing the position of its AST spectrometer, i.e., turning the instrument by 90 deg around its Z- and X-axes so that its windows now face the SM starboard and port panels. The CDR also replaced the spectrometer's PCMCIA memory card (#933) with card #934. *[The last position change was done on 5/16 when AST was moved from SM panel 126 to panel 325.]*

Clay and Oleg performed the CHeCS CMO (Crew Health Care Systems/Crew Medical Officer) on-board training drill, a 30-min. video & audio refresher course to hone the CMO's acuity in emergency medical operations. *[The proficiency drill focuses on re-familiarization with skills and techniques required in procedures related to medical issues arising on board and concludes with a self-assessment questionnaire.]*

Anderson continuing his support of the EPO (Educational Program Operation) "Kit C" project, today by checking the growth chamber for humidity. *[The demo/ experiment studies the growth of basil and lettuce plants in zero-G, in support of an Engineering Design Challenge for K-12 students of all abilities, in which students are designing their own growth chambers and growing basil seeds flown on STS-118/13A.1. During the 20-day run, Clay takes still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants will be watered on all odd numbered days. To determine if the plants need water, Clay looks in a viewport to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation, it'll be crew's choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

The FE-2 conducted the periodic status checkup & filter inspection of the running CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to Earth.]*

Later today, the FE-1 will unstow and install the equipment for the periodic Russian PZE-MO-10 "Hematokrit" testing that is scheduled tomorrow for all three crewmembers. *[MO-10 measures the hematocrit (red blood cell mass) value of the blood (it is a well-known phenomenon of space flight that red blood cell mass {normal range: 30-45%} tends to go down over time).]*

Oleg conducted the daily routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Kotov is also scheduled to collect the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Clay will be working on the IMS, updating/editing the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Anderson downloads the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:22am EDT, the FE-2 powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), and at 4:27am conducted a radio exchange with students at Amagasaki Child Science Hall, Amagasaki, Hyogo/Japan. Questions from the kids were uplinked beforehand by the ARISS (Amateur Radio on International Space Station) organization. [*"Do astronauts have decayed teeth?"; "Is food floating in the stomach in the zero gravity?"; "What is the most wonderful event these days?"; "What would you do if a solar battery ran out?"*]

Working from the Russian discretionary "time permitting" job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). [*This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.*]

Also as a task from the voluntary job list, Oleg performed the regular health check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

*Saturday Science Preview:* Three optional activities for the voluntary "Saturday Science" program on the upcoming three-day Labor Day weekend (9/1-3) 8/25 & 26 were suggested to Clay for his choice. His selection is required by tonight. [*The three choices are (1) voice & video of another run of CFE VG1 (Capillary Flow Experiment – Vane Gap 1) to complete the CFE-VG1 experiment, (2) SPHERES*

*(Synchronized Position Hold, Engage, Reorient, Experimental Satellites), flying two and three satellites, requiring CDRA (CO<sub>2</sub> Removal Assembly) to be running, and (3) BCAT-3 (Binary Colloidal Alloy Test 3) Magnet Unstick, using the CGBA-4 (Commercial Generic Bioprocessing Apparatus 4), powered up 12 hrs before.]*

Today's CEO (Crew Earth Observation) photo targets were **Smoke plumes, southern Greece** (*Southern Greece, especially the Peloponnese peninsula near the ancient city of Olympia, is experiencing widespread wild fires – possibly the worst since 1871. Shooting left: the smoke plumes are trending ever more directly south, nearer to the ISS track over Crete. Including coastlines in the images will assist viewers*), **Mullan-Buffalo Trails, Montana** (*for educational purposes, CEO requested a mapping swath of nadir images of trails in neighboring Montana wildernesses for student use. More detailed images may be requested later*), and **Milk River Trails, Montana** (*for educational purposes, CEO requested a nadir mapping swath of images of trails in neighboring Montana wildernesses for student use.*)

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:17am EDT [= epoch]*):

Mean altitude -- 340.9 km

Apogee height – 346.3 km

Perigee height -- 335.4 km

Period -- 91.35 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008144

Solar Beta Angle -- -37.1 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 75 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 50218

**Significant Events Ahead** (*all dates Eastern and **subject to change***):

08/29/07 -- Prep for PMA-3 depress, install CBCS, check out 2 CBMs (ground);

08/30/07 -- PMA-3 depress & relocation (from Node 1 port to nadir, for 10A Node 2 install);

08/31/07 – Clean-up after relocation, restow bags (enabling Node 2 access);

09/03/07 -- Labor Day Holiday

09/04/07 -- Attitude Maneuver for ASN Testing (for ATV-1)  
09/19/07 -- Progress M-60/25P undocking (SM aft port)  
09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/04/07 -- 50 Years of Spaceflight (Sputnik 1)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate  
10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation  
11/08/07 -- Node 2 (Harmony) relocation  
11/13/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
03/03/08 -- ATV-1 docking (SM aft port)  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/26/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/28/08 -- STS-124/Discovery/1J docking  
05/??/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)

09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/27/07  
**Date:** Monday, August 27, 2007 1:27:39 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/27/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 19 of Increment 15.*

First day of the week-long activities dealing with PMA-3 (Pressurized Mating Adapter 3) relocation from the Node 1 "Unity" portside CBM (Common Berthing Module) to the Node nadir (earth-pointing) CBM to make room for the installation of Node 2 "Harmony" arriving with STS-120/10A in October (10/25). FE-2 Anderson today took the following steps:

- Hooked up the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable at the Cupola RWS (Robotics Work Station) in support of SSRMS (Space Station Remote Manipulator System) video coverage; afterwards
- Reviewed, for one hour, the POC DOUG (Portable Onboard Computer Dynamic Ubiquitous Graphics) software for the subsequent SSRMS activities, then
- Conducted SSRMS operations by successfully maneuvering the robotarm through an inchworm-like double walk-off from MBS PDGF-2 (Mobile Base System Power & Data Grapple Fixture 2) to MBS PDGF-3 and then to Lab PDGF); after which he
- Cleaned out the Node as required by transferring & relocating/restowing cargo equipment, and finally
- Reconfigured the Node's power outlet panel for connecting the CBCS (Centerline Berthing Camera System).

Later in the day, Anderson also completed an on-orbit debrief with the ground via S-band to discuss cargo transfers during the next Shuttle mission, STS-120/10A.

FE-1 Kotov started the periodic regeneration of the Russian Harmful Impurities Removal System (BMP) by initiating the "bake-out" cycle to vacuum on absorbent

bed #1 of the dual-channel filtration system. The bake-out will be terminated at ~4:15pm EDT. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

CDR Yurchikhin and FE-1 Kotov each performed the Russian MBI-21 PNEVMOKARD experiment, their third on-orbit session (which forbids moving or talking during data recording). The experiment is controlled from the RSE-Med A31p laptop, equipped with new software, and uses the TENSOPUS sphygmomanometer to measure arterial blood pressure. *[PNEVMOKARD (Pneumocard) is an attempt to obtain new scientific information to refine the understanding about the mechanisms used by the cardiorespiratory system and the whole body organism to spaceflight conditions. By recording (on PCMCIA cards) the crewmember's electrocardiogram, impedance cardiogram, low-frequency phonocardiogram (seismocardiogram), pneumotachogram (using nose temperature sensors), and finger photoplethysmogram, the experiment supports integrated studies of (1) the cardiovascular system and its adaptation mechanisms in various phases of a long-duration mission, (2) the synchronization of heart activity and breathing factors, as well as the cardiorespiratory system control processes based on the variability rate of physiological parameters, and (3) the interconnection between the cardiorespiratory system during a long-duration mission and the tolerance of orthostatic & physical activities at the beginning of readaptation for predicting possible reactions of the crewmembers organism during their return to ground.]*

Kotov conducted the Russian INFRASOUND experiment, taking noise measurements in the SM (Service Module) before and after replacing the regular Position VT1 ventilation fan (MO-2-5008) with a new low-noise fan (17KS.53Yu 5009-0). Measurements were taken with a mike-equipped sound level meter (SLM) at various positions in the cabin with and without the #2 DS-7A smoke detector and SKV-2 air conditioner running, as well with certain wall panels (#204-205) installed and removed. The SLM data were then transferred to the MEC (Medical Equipment Computer) for subsequent downlink. *[INFRASOUND (Infrasvuk-M) compares the spectral (spectrum-specific) energy characteristics of extremely low and low electromagnetic frequency ranges and infrasonic fields in habitable compartments of the SM under operating conditions of the old and new ventilation fans. The experiment takes measurements of acoustic noise level inside the SM in full scope with a sound analyzer and laptop for subsequent downlink of the measured data. The results are expected to help resolve design issues regarding the rating and crew protection against harmful effects of acoustic and electromagnetic fields in the ISS living compartments.]*

TsUP/Moscow started the scheduled testing of the Russian ASN-M Satellite

Navigation Equipment, to extend over the next two weeks. In support, CDR Yurchikhin configured Laptop 3 with the necessary software (i.e., scripts, new drivers, etc.) for collecting raw ASN-M test data and then connected it to the primary RS-1553B data bus of the onboard cabling system (BKS) for ground access via RGS (Russian Ground Site) passes. *[The ASN will be required for proximity operations and docking approach of the European ATV-1 (Automated Transfer Vehicle 1) "Jules Verne" to the SM aft end, currently planned for early March 2008.]*

Oleg Kotov had another hour set aside for Progress M-61/26P unloading and cargo transfers, keeping track of movements in the IMS (Inventory Management System).

Fyodor Yurchikhin conducted the daily routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Wearing protective gear, Yurchikhin performed routine service on the ASU toilet facility in the SM by replacing its pretreat container (E-K) plus hose with a new assembly and discarding the old one. *[E-K contains five liters of pre-treat solution, - a mix of H<sub>2</sub>SO<sub>4</sub> (sulfuric acid), CrO<sub>3</sub> (chromium oxide, for oxidation and purple color), and H<sub>2</sub>O (water). The pre-treat liquid is mixed with water in a dispenser (DKiV) and used for toilet flushing.]*

Working on the IMS, the CDR also updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Clay Anderson continued his support of the EPO (Educational Program Operation) "Kit C" project, today by taking photos to document the plant growth in zero-G. *[The demo/experiment studies the growth of basil and lettuce in zero-G, in support of an Engineering Design Challenge for K-12 students of all abilities. During the 20-day run, Clay takes still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants will be watered on all odd numbered days. To determine if the plants need water, Clay looks in a viewport to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation, it'll be crew's choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

The FE-2 also conducted the periodic (every two weeks) inspection of the RED (Resistive Exercise Device) canister cords and accessory straps as well as the canister bolts for re-tightening if required.

The crew completed their regular daily physical workout program (about half of

which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS (CDR, FE-1), RED resistive exerciser (FE-1, FE-2), and VELO cycle with bungee cord load trainer (CDR).

Later this afternoon, Fyodor downloads the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~9:25am EDT, the crew conducted two PAO TV interview exchanges, - one with KLKN-TV, Lincoln, Nebraska (Jon Jordan), the other with The Lincoln Journal Star (Al Laukaitis). *[Nebraska is Clay Anderson's home state.]*

Working from the Russian discretionary "time permitting" job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second voluntary job for the Russian crewmembers was the periodic inspection behind panels 206-220 in the SM, to check equipment, connectors and the shell for any residue or condensate.

Two recurring items appeared again on the discretionary task list for Fyodor: (1) an equipment audit in the Russian segment (RS) of the ISS, behind stowage panels in the FGB, supported by an uplinked comprehensive list, and (2) to continue shooting photo/video footage of the RS modules' interiors.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 6:55am EDT [= epoch]):

Mean altitude -- 340.9 km

Apogee height -- 346.4 km

Perigee height -- 335.5 km

Period -- 91.35 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0008075  
Solar Beta Angle -- -34.2 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.76  
Mean altitude loss in the last 24 hours -- 88  
Revolutions since FGB/Zarya launch (Nov. 98) -- 50202

**Significant Events Ahead** (*all dates Eastern and **subject to change***):

08/28/07 -- CBM & Robotic training, SSRMS maneuvering to view PMA-3 relocation;  
08/29/07 -- Prep for PMA-3 depress, install CBCS, check out 2 CBMs (ground);  
08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
09/04/07 -- Attitude Maneuver for ASN Testing (for ATV-1)  
09/19/07 -- Progress M-60/25P undocking (SM aft port)  
09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/04/07 -- 50 Years of Spaceflight (Sputnik 1)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate  
10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/06/07 -- PMA-2 relocation  
11/08/07 -- Node 2 (Harmony) relocation  
11/13/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/06/08 -- Progress M-62/27P undocking  
02/07/08 -- Progress M-63/28P launch  
02/09/08 -- Progress M-63/28P docking  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
03/03/08 -- ATV-1 docking (SM aft port)  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (DC1)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/26/08 -- STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/28/08 -- STS-124/Discovery/1J docking  
05/??/08 -- Soyuz TMA-12/16S relocation (from DC1 to FGB nadir port)  
05/04/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking (DC1)  
07/29/08 -- ATV-1 undocking (from SM aft port)  
08/11/08 -- Progress M-64/29P undocking (from DC1)  
08/12/08 -- Progress M-65/30P launch  
08/14/08 -- Progress M-65/30P docking (SM aft port)  
09/13/08 -- Progress M-66/31P launch  
09/15/08 -- Progress M-66/31P docking (DC1)  
09/20/08 -- (NET) STS-126/Discovery/ULF2 launch – MPLM(P), LMC  
10/01/08 -- (NET) STS-126/Discovery/ULF2 undocking.  
10/11/08 -- Progress M-65/30P undocking (from SM aft port)  
10/14/08 -- Soyuz TMA-13/17S launch  
10/16/08 -- Soyuz TMA-13/17S docking (SM aft port).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/26/07  
**Date:** Sunday, August 26, 2007 1:36:55 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/26/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday. Ahead: Week 19 of Increment 15.*

FE-1 Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM (Service Module), including ASU toilet facilities systems/replaceables plus the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Kotov also gathered data on total operating time & "On" durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

After the CDRA (Carbon Dioxide Removal Assembly) was deactivated by ground command overnight and cooling is no longer required, FE-2 Anderson disconnected the ITCS LTL QD (Internal Thermal Control System Low Temperature Loop Quick Disconnect) jumper.

Clay Anderson also continued his support of the EPO (Educational Program Operation) "Kit C" project by checking the growth chamber for humidity. *[The demo/experiment studies the growth of basil and lettuce in zero-G, in support of an Engineering Design Challenge for K-12 students of all abilities. During the 20-day run, Clay takes still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants will be watered on all odd numbered days. To determine if the plants need water, Clay looks in a viewport to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation, it'll be crew's choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

At ~6:45am EDT, the FE-2 powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), and at 6:50am conducted a radio exchange with students at Nanjing No.3 High School, Nanjing, Jiangsu/P.R.China. Questions from the ham amateurs were uplinked beforehand by the ARISS (Amateur Radio on International Space Station) organization. [*“Can you see the Great Wall from the ISS?”; “Do you sweat in space and how do you handle it?”; “If air leak happens in the ISS, what emergency actions will be taken?”; “On the ISS, in which direction will the plants grow?”*]

At ~10:10am, Clay had his weekly PFC (Private Family Conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop).

The crewmembers completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Working from the Russian discretionary “time permitting” job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). [*This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.*]

As another voluntary task, the CDR performed the second part of the new session of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature.

[*Today's Uragan photo targets were the Olympic village site in the delta of the Mzymta river between Adler airport and the Psou river, the upper region of the Mzymta river valley, mountain valleys in nadir, the entire stretch of the Katun river valley to Lake Teletsk (eastern shore), the Steppe on the left eastern shore of Volga river to the south of Saratov (Y. A. Gagarin's landing site, Ugra National Park, the northern section of Aral Sea, and the decaying Hurricane Dean.*]

A second voluntary job for Kotov was the periodic data collection and downlinking for the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse.

*PMA-3 Relocation Overview:* On 8/30 (Thursday), the Pressurized Mating Adapter #3 is scheduled to be relocated from Node 1 Unity's portside CBM (Common Berthing Module) to the nadir port to make room for the installation of Node 2

(Harmony) on the port dock during Mission 10A/STS-120. Detailed procedural materials for Robotics & CBM proficiency training have been uplinked. Extensive activities are scheduled throughout next week:

- *Tomorrow (Monday, 8/27):* Reconfigure Node 1 (stowage, UOP outlet for CBCS install), plus initial SSRMS (Space Station Remote Manipulator System) ops: double-walk from MBS PDGF-2 (Mobile Base System Power & Data Grapple Fixture 2) to MBS PDGF-3 and then to Lab PDGF);
- *Tuesday (8/28):* Close Lab window shutter, do CBM & Robotic ops training, release SSRMS from MBS PDGF-3 and maneuver to Node nadir CBM survey position while remained based on Lab PDGF;
- *Wednesday (8/29):* Prepare for PMA-3 depressurization, open Node nadir hatch latch (door being kept sealed by ~38,993 lbf), install CBCS (Centerline Berthing Camera System), ground check out both CBMs overnight;
- *Thursday (8/30):* Power on CBCS, depressurize PMA-3, Clay grapple PMA-3, Fyodor unbolt PMA-3, SSRMS transfer PMA-3 to nadir CBM, SSRMS ungrapple after bolts secured, power down CBCS, re-latch Node hatch door.
- *Friday (8/31):* Cleanup, reconfigure Node 1 stowage, get-ahead relocate stowage for Node 2 (Harmony” ingress during 10A.

*ASN Testing:* Tomorrow (8/27), TsUP/Moscow begins two-week testing of the Russian Satellite Navigation Equipment (ASN), with data download to Laptop 3 for ground access via RGS (Russian Ground Site) passes. This is in preparation for the arrival of the European ATV-1 (Automated Transfer Vehicle 1) “Jules Verne”, currently planned for early March 2008, which requires ASN for proximity operations and docking approach to the SM aft end.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 6:34am EDT [= epoch]):

Mean altitude -- 341.0 km

Apogee height – 346.5 km

Perigee height -- 335.6 km

Period -- 91.36 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0008066

Solar Beta Angle -- -30.9 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.76  
Mean altitude loss in the last 24 hours -- 65  
Revolutions since FGB/Zarya launch (Nov. 98) -- 50186

**Significant Events Ahead** (all dates Eastern and subject to change):

08/29/07 -- ISS reboost (if required)  
08/29/07 -- SSRMS setup for viewing PMA-3 relocation  
08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
09/04/07 -- Attitude Maneuver for ASN Testing (for ATV-1)  
09/19/07 -- Progress M-60/25P undocking (SM aft port)  
09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/04/07 -- 50 Years of Spaceflight (Sputnik 1)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate  
10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/08/07 -- Node 2 "Harmony" relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/11/08 -- Progress M-62/27P undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
03/02/08 -- ATV-1 docking (SM aft port)  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking

05/02/08 -- STS-124/Discovery/1J undocking

05/14/08 -- Progress M-64/29P launch

05/16/08 -- Progress M-64/29P docking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/25/07  
**Date:** Saturday, August 25, 2007 2:33:55 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/25/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday -- off-duty day for the crew except for housekeeping and voluntary work.*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

At ~8:50am EDT, the crewmembers held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Before lunch (~9:20am), FE-2 Anderson filled out the regular FFQ (Food Frequency Questionnaire), his eighth, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

The CDR conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Clay Anderson continued his support of the EPO (Educational Program Operation) "Kit C" project by taking photos to document the plant growth in zero-G. *[The demo/experiment studies the growth of basil and lettuce in zero-G, in support of an Engineering Design Challenge for K-12 students of all abilities. During the 20-day run, Clay takes still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants will be watered on all odd numbered days. To determine if the plants need water, Clay looks in a viewport to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation, it'll be crew's choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

In the "Quest" Airlock, the FE-2 terminated the regeneration process on the second set of METOX (Metal Oxide) CO<sub>2</sub> absorption canisters (#0020, #0021) started yesterday and stowed the cans.

The CDR and FE-1 had their weekly PFCs (Private Family Conferences) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop), Yurchikhin at ~6:30am EDT, Kotov at ~8:00am.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later this afternoon, Clay downloads the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from the Russian discretionary "time permitting" job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

Also as one of the voluntary tasks for today, the CDR performed another session of the Uragan Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on

nature. *[Today's Uragan photo targets were the Altai mountains, the entire stretch of Katun river valley, the Eastern shore of Lake Teletsk Lake, the Irkut river valley from Lake Khubsugul to Lake Baikal, the Baikal shore from its south point to Angara river and further, the Katun range and Belukha peak, Altai's highest area (here Katun arches around the range at 330° in nadir), the Alps to the east of Lake Geneva, glaciers on the south shore of the Rhone river (near arched dams), Ugra National Park (Kaluga), the Steppe on the left eastern shore of Volga river to the south of Saratov: Yuri A. Gagarin's landing site (at 45.98°E, 51.23°S), Peru, the Andes, the Huascarán volcano, Patagonia ice field, and the Waddell Sea.]*

A second voluntary job for Kotov was to use the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

As a third discretionary task on his list, Oleg completed another data monitoring & calldown session with the Matryoshka-R radiation payload and its LULIN-5 electronics box.

A special voluntary task for the FE-1 today was to set up the equipment in the SM for a new Russian experiment called INFRASVUK-M (Infrasound) scheduled on 8/27 (next Monday), by replacing one of the nominal ventilation fans (VT1 MO-2-5008) with a new experimental low-noise fan (17KS.53Yu 5009.0). *[INFRASOUND will compare the spectral (spectrum-specific) energy characteristics of extremely low and low electromagnetic frequency ranges and infrasonic fields in habitable compartments of the SM under operating conditions of the old and new ventilation fans. The experiment will perform measurements of acoustic noise level inside the SM in full scope with a sound analyzer and laptop for subsequent downlink of the measured data. The results are expected to help to resolve design issues regarding the rating and crew protection against harmful effects of acoustic and electromagnetic fields in the ISS living compartments.]*

**PMA-3 Relocation Update:** On 8/30 (Thursday), the Pressurized Mating Adapter #3 is scheduled to be relocated from Node 1 Unity's portside CBM (Common Berthing Module) to the nadir port to make room for the installation of Node 2 (Harmony) on the port dock during Mission 10A/STS-120. Detailed procedural materials for Robotics & CBM proficiency training have been uplinked. Extensive activities are scheduled throughout next week:

- *Monday (8/27):* Reconfigure Node 1 (stowage, UOP outlet for CBCS install), plus initial SSRMS (Space Station Remote Manipulator System) ops: double-walk from MBS PDGF-2 (Mobile Base System Power & Data Grapple Fixture 2) to MBS PDGF-3 and then to Lab PDGF);
- *Tuesday (8/28):* Close Lab window shutter, do CBM & Robotic ops training,

release SSRMS from MBS PDGF-3 and maneuver to Node nadir CBM survey position while remained based on Lab PDGF;

- *Wednesday (8/29)*: Prepare for PMA-3 depressurization, open Node nadir hatch latch (door being kept sealed by ~38,993 lbf), install CBCS (Centerline Berthing Camera System), ground check out both CBMs overnight;
- *Thursday (8/30)*: Power on CBCS, depressurize PMA-3, Clay grapple PMA-3, Fyodor unbolt PMA-3, SSRMS transfer PMA-3 to nadir CBM, SSRMS ungrapple after bolts secured, power down CBCS, re-latch Node hatch door.
- *Friday (8/31)*: Cleanup, reconfigure Node 1 stowage, get-ahead relocate stowage for Node 2 (Harmony” ingress during 10A.

*GPS-1 Failure*: Ground specialists at MCC-Houston are investigating yesterday’s failure of SIGI-1 (Space Integrated Global Positioning Satellite/Inertial Navigation Systems 1) resulting in loss of redundancy for vehicle state vector updates, but other sources of state determination (GPS-2 & Russian data) are available.

*[Failure signatures indicated a timing issue that has occurred before.]*

*ASN Testing*: On Monday (8/27), TsUP/Moscow will begin two-week testing of the Russian Satellite Navigation Equipment (ASN), with data download to Laptop 3 for ground access via RGS (Russian Ground Site) passes. This is in preparation for the arrival of the European ATV-1 (Automated Transfer Vehicle 1) “Jules Verne”, currently planned for early March 2008, which requires ASN for proximity operations and docking approach to the SM aft end.

*VOA Maintenance Update*: During yesterday’s OMI (On-orbit Maintenance Item) change-out on the CHeCS VOA (Volatile Organics Analyzer), the FE-2 discovered that the new 26P-delivered inlet nozzle filter has the wrong dimension for fitting on the inlet nozzle. Following ground advice, Clay reinstalled the old filter (certified lifetime expired on 7/24/07 but still OK). *[The VOA Maintenance was erroneously reported yesterday as having proceeded without issues.]*

### **Weekly Science Update** (*Expedition Fifteen -- 17<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS)*: Activity planned on 8/27 to exchange memory card 4.

*ANITA*: Planned.

*BCAT (Binary Colloidal Alloy Test)*: Reserve.

*CARDIOCOG-2*: Next session currently scheduled for beginning of September (TBC).

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS):* Continuing,

*CFE (Capillary Flow Experiment):* Reserve.

*CHROMOSOME-2 (E14 SFP):* Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* Complete.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* Powered off.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Next scheduled operation is 10/29-11/3.

*EMCH (Elastic Memory Composite Hinge):* Complete.

*EPO (Educational Payload Operation) Kit C:* Planned.

*IMMUNO (Saliva Sampling):* First session samples are currently stowed in MELFI Dewar #2.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* Samples were successfully uploaded on 13A.1 and transferred to ISS on 8/12. 56 Files required for the start of MULTIGEN-1 were uplinked successfully. Start of MULTIGEN-1 experiment will begins today, 8/25, after the 24 hour hydration period.

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* Planned.

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION*: “Clay, please pass on our enthusiastic thanks to Fyodor and Oleg for their last minute help packing Nutrition samples into the cold bag. They packed our samples perfectly. We received everything we expected and in perfect condition. This represents the first time that these types of samples have been returned from ISS. To us it’s a really big deal.”

*PMDIS (Perceptual Motor Deficits in Space)*: Complete.

*SAMPLE*: Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems)*: n/a

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight)*: “Clay, thanks for completing your third Actiwatch download.”

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite)*: Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft)*: Planned.

*TRAC (Test of Reaction & Adaptation Capabilities)*: Planned.

*CEO (Crew Earth Observations)*: Through 8/21 the ground has received a total of 10,555 CEO images for review and cataloging for Increment 15. After standing down from CEO support to the ISS in order to support imagery analysis for the Shuttle Mission on 8/8, CEO resumed ISS activities on 8/22. “Your dramatic views of the extensive forest fires in Montana and Idaho while the shuttle was docked on 8/13 were published last weekend on NASA/GSFC’s Earth Observatory website. Kudos to the crew noting and documenting this dynamic event amid the all the activity of joint operations! This weekend your earlier, incredibly detailed view of the historic Spanish enclave of Ceuta on the northern coast of Africa will also be published on Earth Observatory. Nice work! Now that the shuttle mission is complete and your orbit tracks have returned to the Northern Hemisphere we are looking forward to more of your imagery of our targets.”

Today’s CEO (Crew Earth Observation) photo targets were **Afar Rift Zone, Ethiopia** (*the volcanoes and numerous fault lines in the country rock of Ethiopia’s Afar region are a continuation of the Red Sea zone where the African and Arabian tectonic plates are slowly moving apart. Looking right just inland from the shoreline of the Red Sea. The Afar is one of the few places where geologists can study “sea-floor spreading” processes [active faulting and lava extrusion] on dry land*), **Wild fires, Sicily** (*late August wild fires have caused much damage and injury in northern Sicily. Looking left of track for fire source points, and oblique views of the*

*long smoke plumes. The crew may also have seen Mt. Etna smoking), and Yellowstone National Park, Wyoming (shooting a sequence of overlapping images at nadir to document the recovery of burned zones in the National Park).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Current Life Support Status** (*as of late yesterday*):

Elektron -- On (Nominal – 32 amp mode)

Vozdukh -- On (nominal)

SKV-1 (SM Air Conditioner 1) -- Off

SKV-2 (SM Air Conditioner 2) -- Off (nominal)

CDRA Carbon Dioxide Removal Assembly -- Standby (nominal)

MCA (Major Constituent Analyzer) -- Operational (nominal)

OGA (Oxygen Generation Assembly) -- Off (nominal)

**ISS Orbit** (*as of this morning, 7:43am EDT [= epoch]*):

Mean altitude -- 341.1 km

Apogee height – 346.5 km

Perigee height -- 335.7 km

Period -- 91.36 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.000802

Solar Beta Angle -- -23.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 60

Revolutions since FGB/Zarya launch (Nov. 98) -- 50171

**Significant Events Ahead** (all dates Eastern and subject to change):

08/29/07 -- ISS reboost (if required)

08/29/07 -- SSRMS setup for viewing PMA-3 relocation

08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

09/04/07 -- Attitude Maneuver for ASN Testing (for ATV-1)

09/19/07 -- Progress M-60/25P undocking (SM aft port)

09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/04/07 -- 50 Years of Spaceflight (Sputnik 1)

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate  
10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/08/07 -- Node 2 "Harmony" relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/11/08 -- Progress M-62/27P undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
03/02/08 -- ATV-1 docking (SM aft port)  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/24/07  
**Date:** Friday, August 24, 2007 2:03:14 PM  
**Attachments:**

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**ISS On-Orbit Status 08/24/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, Yurchikhin, Kotov and Anderson started out with another session of the Russian biomedical routine assessments PZEh-MO-7/Calf Volume Measurement and PZEh-MO-8/Body Mass Measurement (eighth time for CDR & FE-1, fifth for FE-2), using the IM mass measurement device which Oleg Kotov afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

For their 1.5-hr. TVIS workout, Yurchikhin and Kotov today each conducted the standard Russian PFE test MO-3, their second, using the treadmill in unmotorized mode and wearing the Kardiokassette KK-2000 belt with three chest electrodes. *[The fitness test, controlled from the RSE-Med laptop, yields ECG (electrocardiogram) readings to the KK-2000 data storage device, later to be downlinked via U.S. OCA. Before the run, the KK-2000 was synchronized with the computer date/time readings. For the ECG, the crewmembers worked out on the treadmill, first walking 3 min. up to 3.5 km/h, then running at a medium pace of 6.5 km/h, followed by the maximum pace not exceeding 10 km/h, then walking again at gradually decreasing pace.]*

In preparation for an extended upcoming session of the new MULTIGEN-1 experiment, FE-2 Anderson set up the EMCS (European Modular Cultivation System), switching out its power cable for a longer (23') cable at ER3 (to protect against start-up overcurrents), opening the EMCS gas mix valves, and exchanging the EMCS Reference ECs (Experiment Containers) with eight MULTIGEN ECs on the two RBLSS (Rotor Based Life Support System) modules, four on centrifuge rotor A, the other on rotor B. *[The 298-kg EMCS, delivered on ULF1.1, is a multi-purpose combination centrifuge/growth chamber with eight small research containers that allows plant growth experiments to be carried out in controlled partial and microgravity conditions and under controlled pressure, light, temperature and humidity. The goal of these experiments is to enable growing plants in space that could serve as a basic nutrition source for astronauts on future long-duration missions to the Moon or Mars. MULTIGEN-1 is a plant growth payload studying the growth patterns of Thale Cress (Arabidopsis thaliana) under varying gravity effects. The experiment will run for 70-75 days and require very little crew involvement. Thale cress has a small genome, which makes it very useful for genetic mapping and sequencing. Its small size and rapid life cycle are also advantages, taking only about six weeks from germination to mature seeds and it produces many seeds.]*

Continuing the current round of RS (Russian segment) ventilation system maintenance, Oleg Kotov worked in the DC1 (Docking Compartment), cleaning the PF1 & PF2 dust collectors and V1 & V2 fan grilles. He then replaced the PS1 & PS2 dust filters in the *Funktsionalnyi-Grusovoi Blok* (FGB).

The CDR and FE-1 had about 3 hours reserved for assembling and evaluating a new ergonomic operator's seat attached to the floor of the SM (Service Module), unpacked yesterday by Oleg. At the end, the seat was taken apart again and stowed. *[After the seat's assembly and positioning, the crew took video and still photography of their subsequent ergonomic evaluation of the seat. They also assessed the times required for assembly, height adjustment and disassembly as well as the relative ease of transferring the partially disassembled and stowed (folded) seat from the SM to the FGB through the PkhO (Transfer Compartment). The seat's suitability and comfort was tested when working with ODF (Operation Data File) books, laptop computer, photo-video equipment, during medical tests, meals and for any two-hand operations.]*

Clay Anderson performed the IFM (In-flight Maintenance) on the VOA (Volatile Organics Analyzer) set up yesterday, first removing the analyzer from its location in the CHeCS (Crew Health Care Systems) rack, then replacing nine OMIs (On-orbit Maintenance Items) with new spares from 26P, afterwards reinstalling the VOA in the rack, activating it and checking it out. No problems were noted during the activity.

Kotov conducted troubleshooting on an IDZ-2 smoke detector (#6) in the FGB after its power-down by the ground and safing of fuses. The testing focused on the cabling and connectors of the unit, with circuit continuity being checked via resistance measurements with the “Elektronika” MultiMeter (MMTs-01).

Anderson continued his support of the EPO (Educational Program Operation) “Kit C” project by conducting today’s check-and-photo activity of the plant growth in zero-G. The demo experiment studies the growth of basil and lettuce in zero-G, in support of an Engineering Design Challenge for K-12 students of all abilities. *[During the 20-day run, Clay takes still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants will be watered on all odd numbered days. To determine if the plants need water, Clay looks in a viewport to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation, it’ll be crew’s choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

Clay completed the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit).

Batteries were to be replaced if necessary. *[Purpose of the 10-min. activity is to trend with MCA (Major Constituents Analyzer), i.e., to correlate the hand-held readings with MCA measurements. Two CSA-CP (CSA-Combustion Products) instruments recorded O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post (#1060, prime) and in the Node (#1057, backup), while the CSA-O<sub>2</sub> units (#1063, #1042) looked for O<sub>2</sub> in the Lab and the CDMK (#1008) for CO<sub>2</sub> in SM and Lab. Also recorded were battery ticks. The instruments were turned off afterwards, except for the prime CSA-CP #1060 unit, and returned to their regular locations.]*

In the “Quest” Airlock, Anderson terminated the regeneration process on two METOX (Metal Oxide) CO<sub>2</sub> absorption canisters (#0016, #0019) started two days ago (8/22), and initiated the bake-out on the second set (#0020, #0021).

The FE-2 completed the regular bi-weekly maintenance reboot of the SSC (Station Support Computer) File Server and OCA Comm Router laptops.

Clay also worked on the Node “ceiling”, performing the periodic (every six weeks) bolt tightening on the RED (Resistive Exercise Device) canisters.

Fyodor Yurchikhin conducted the daily routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), the CDR also updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS (CDR/MO-3, FE-1/MO-3), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later this afternoon, Oleg is to download the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:25am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~4:40am, Fyodor and Oleg linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Discussions today concerned a Medical Locker recess barcode, the actuality of a pipeline installed in DC1, the onboard availability of power supply units for sound level meter, stowage location of bonding straps after TsVM and TVM restoration, need for photo equipment lists, etc.]*

At ~5:50am, Yurchikhin and Kotov conducted a telephone session via VHF over RGS (Russian Ground Sites) with the student-winners of a Russian space & aviation contest called "Fifth Ocean".

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio is scheduled at ~3:50pm.

Yesterday morning (~5:15am), the two Russian crewmembers downlinked PAO/TV greetings to the participants of the 5<sup>th</sup> International Conference "150<sup>th</sup> Birthday of K. E. Tsiolkovsky" on Cosmonautics, Radioelectronics and Geoinformatics, to take place on 9/5 at Ryazan. *[ "... We are paying homage and deep respect to the native son of Ryazan, the founder of cosmonautics theory, Konstantin Eduardovich Tsiolkovsky, whose 150<sup>th</sup> Anniversary will be marked on September 17." ]*

Working from the Russian discretionary job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

Also as a discretionary task from his and Fyodor's "time permitting" job list, Oleg performed the regular health check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload, checking proper ventilation of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) by using the hand to check for air flow of three control box fans and six fans of the MIS greenhouse module.

Today's CEO (Crew Earth Observation) photo targets were **Urumqi, China** (*aiming right, at the foot of the mountain range, for China's oil-boom city, one of the fastest growing in China*), **Bigach Impact Crater, Russia** (*looking a touch right for this 8-km-diameter crater. The visual cue is Lake Zaysan just downtrack, and a group of agricultural fields that lie within the crater rim*), and **Licancabur Volcano, Chile** (*CREW REQUEST: Looking right of track. If the crew photographed a continuous mapping swath they got the volcano which lies on the edge of the Andes Mountains. Long, dark lava flows down the volcano flank, and bright green Laguna Verde nearby, are visual cues*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 11:46am EDT [= epoch]):

Mean altitude -- 341.2 km

Apogee height -- 346.6 km

Perigee height -- 335.8 km

Period -- 91.36 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0008042

Solar Beta Angle -- -19.1 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 74

Revolutions since FGB/Zarya launch (Nov. 98) -- 50142

**Significant Events Ahead** (all dates Eastern and subject to change):

08/29/07 -- ISS reboost (if required)  
08/29/07 -- SSRMS setup for viewing PMA-3 relocation  
08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
09/04/07 -- Attitude Maneuver for ASN Testing (for ATV-1)  
09/19/07 -- Progress M-60/25P undocking (SM aft port)  
09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/04/07 -- 50 Years of Spaceflight (Sputnik 1)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate  
10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/08/07 -- Node 2 "Harmony" relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/26/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/11/08 -- Progress M-62/27P undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
03/02/08 -- ATV-1 docking (SM aft port)  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/23/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- STS-124/Discovery/1J docking  
05/02/08 -- STS-124/Discovery/1J undocking  
05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/23/07  
**Date:** Thursday, August 23, 2007 1:56:20 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/23/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-2 Clay Anderson had 3h 15m reserved for unpacking and stowing cargo delivered by STS-118/13A.1, guided by an uplinked detailed Unpack List.

CDR Yurchikhin performed the periodic inspection behind panel 301 in the DC1 (Docking Compartment) and panels 206-220 in the SM (Service Module), checking equipment, connectors and the shell for any residue or condensate. *[If found, photographs were to be taken and transferred to OCA for downlink.]*

FE-1 Kotov unstowed a new Russian operator's seat for in-cabin use and prepared it for later assembly and installation, placing the unpacked components in a bag.

FE-2 Anderson retrieved new VOA OMI (Volatile Organics Analyzer/On-orbit Maintenance Items) from Progress 26P and set them up for tomorrow's scheduled IFM (In-flight Maintenance) work on the VOA, located in the CHeCS (Crew Health Care Systems) rack.

Yurchikhin prepared, routed and installed new, heavier SUBA (Onboard Equipment Control System) cables in the SM to upgrade a Russian power outlet used for USOS (US segment) equipment. *[The upgrade, from 3 amps to 5 amps, is associated with the ongoing PCS (Portable Computer System) replacement of onboard IBM 760XD laptops with the newer A31p machines, which consume more power.]*

Anderson and Yurchikhin had another 45 min for reconfiguring the U.S. Airlock (A/L) after the recent spacewalks to nominal. Clay had an additional hour to complete remaining open items on the uplinked EVA tool restow "matrix"/plan.

While in the A/L, the FE-2 cleaned up after an aborted maintenance discharge on the first two EMU (Extravehicular Mobility Unit) batteries (#2063, #2041), which stopped yesterday because of the "sudden-death" failure of the IBM 760XD laptop (shell #6016) required for running the DOS program of the automated discharge procedure. *[The laptop is believed to have suffered a failure of its hard drive (#6021). Ground specialists are writing procedures for discharging the EMU batteries using an A31p laptop and a floppy boot disk luckily delivered on 13A.1. The activity will be rescheduled once the A31p procedures are verified and onboard.]*

Afterwards, Anderson terminated the regeneration of the two METOX (Metal Oxide) CO<sub>2</sub> absorption canisters (#0016, #0019) started yesterday and initiated the bake-out process on the second METOX set (#0015, ##17).

In the SM, Oleg Kotov worked on the Condensate Feed Unit (BPK) and Condensate Separation & Pumping Unit (BRPK) to restore unrestricted fluid flow through the systems by removing the electro-magnetic flow control valve from each unit for their subsequent dismantling, cleaning of deposits, reassembly and re-installation in their resp. units. *[This activity was deferred last month.]*

Later, Oleg conducted the periodic audit/inventorying of SGO (ACU) Sanitary/Hygienic Equipment in the RS (Russian segment), going by an uplinked detailed list of ~62 equipment items.

The CDR performed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water collected in CWC (Contingency Water Container) #1051 from the Lab CCAA (Common Cabin Air Assembly) dehumidifier. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Anderson spent some time in the Node with a camcorder taping detailed imagery of the current stowage situation. *[The video is intended for use on the ground to evaluate temporary stowage locations for the PMA-3 (Pressurized Mating Adapter 3) relocation next Wednesday (8/29) and to prepare for 10A stowage in October.]*

Kotov collected the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen*

*Cyanide (HCN).]*

Fyodor performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the periodic checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

Working on the IMS (Inventory Management System), the CDR updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Clay conducted the weekly 10-min CWC audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

Before doing his exercise on TVIS, Oleg performed the weekly inspection of the treadmill's bearings. *[For the inspection, a finger or thumb is used to check for any noticeable depressions due to seized or work rollers as the belt is slowly rotated forward to aft.]*

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later this afternoon, Clay will download the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The FE-2 conducted the periodic status checkup & filter inspection of the running CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) incubator payload. *[The incubator is controlled from the ground with automatic video downlinked to Earth.]*

Anderson also continued his support of the EPO (Educational Program Operation) "Kit C" project by conducting the periodic documentary photography, which acts as a "visual photo timeline" of the plant growth in zero-G. The demo experiment studies the growth of basil and lettuce in zero-G, in support of an Engineering Design Challenge for K-12 students of all abilities. *[During the 20-day run, Clay takes still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants will be watered on all odd numbered days. To determine if the plants need water, Clay looks in a viewport to see if water is*

*pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation, it'll be crew's choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

Working off the Russian discretionary job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A new task added to the US crew-choice "job jar" list for Anderson is the change-out of the failed 760XD laptop computer of ER4 (EXPRESS Rack 4) with a new A31p. A subsequent installation of new R.5 software on the laptop for the ER4 RIC (Rack Interface Controller) will be scheduled some time in the future. *[The new computer and RIC software will allow POIC (Payload Operation & Integration Center) flight controllers to command many laptop functions from the ground without crew involvement, e.g., power on/off, reboot, moving files, and downlinking entire directories.]*

*RPC Trip:* Early yesterday morning, an RPC (Remote Power Controller, LA1B\_B RPC 11) tripped open and again after reset. Troubleshooting indicates a standard Hybrid FET (Field Effect Transistor) failure. The RPC controls the OGS (Oxygen Generation System) H<sub>2</sub> (hydrogen) vent line heaters and the H<sub>2</sub> vent valve itself which are required for the next OGS activation. A POR (Power On Reset) could impact the CBM (Common Berthing Mechanism) forward system critical for 10A operations. Ground teams are assessing the requirement and timing of an R&R (removal & replacement) of the RCPM (RCP Module).

*PMA-3 Relocation:* Preparations are underway for the relocation of PMA-3 from Node 1 portside to nadir (for Node 2 installation on 10A), scheduled for Wednesday next week (8/29). Procedures for an SSRMS (Space Station Remote Manipulator System) relocation simulation run, for the set-up of the required video configuration, and for the robotics operations proper have been uplinked for the crew. Part of the relocation will involve a pre-berthing video inspection of the Node nadir CBM petal deployment and a high level survey of the CBM interface.

*TsVM/TVM Update:* With the completion of the new BOK-3 (Command Processing Unit) installation, all that remained was yesterday's integration of the TsVM/SMCC Control and TVM/SMTC Navigation computers. After each connection, each computer was restarted and commands sent to restore system functionality. All

three lanes in each computer were restarted and integrated successfully. This completes all software and hardware tasks related to restoring Russian computer control and BOK R&R. There will be two more sets of tests in the near future, intended to verify the capability of BOK-3 to control (a) N<sub>2</sub> (nitrogen) transfer in the SM and (b) commanding to the DC-1.

*Vozdukh Update:* On Tuesday (8/21), Vozdukh suffered a failure of its Channel 2 valve assembly. The CO<sub>2</sub> (Carbon Dioxide) removal system was successfully recovered and returned to nominal operations, with Yurchikhin switching it first to Automatic Mode, then (yesterday) back to Manual Mode 5.

Today's CEO (Crew Earth Observation) photo targets were **Eastern Tien Shan, China** (*continental glaciers on high mountains hold a different history of environmental change than coastal glaciers. The crew was asked to shoot glacier tongues of the Tien Shan range, all left of track, while images of the dust event in the deserts just before the Tien Shan glaciers--apparent on weather satellite images--should also be interesting*), **Arkenu 1 & 2 Impact Craters, Libya** (*the twin Arkenu craters, 7 and 10 km in diameter, lie in SW Libya. Visual cues for finding these small features are major, dark volcanic rocks. Twin craters are thought form when a single impactor breaks into two as it strikes the Earth's atmosphere*), **Nile River Delta, Egypt** (*shooting detailed, overlapping images, in a mapping swath along track, to document fast land use changes in the delta*), and **High Central Andean Glaciers** (*weather was particularly clear over the high Andes: the crew was to look for snow/ice-capped peaks near nadir. Two ice caps have been cored by geologists in the last decade and show major changes in snow accumulation rates over the last several hundred years. Most ice caps are melting fast at present, however.*)

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Eccentricity -- 0.0008042

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08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
09/19/07 -- Progress M-60/25P undocking (SM aft port)  
09/27/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/04/07 -- 50 Years of Spaceflight (Sputnik 1)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
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10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/08/07 -- Node 2 "Harmony" relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/18/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
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02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- STS-123/Endeavour/1J/A docking  
02/27/08 -- STS-123/Endeavour/1J/A undocking  
03/02/08 -- ATV-1 docking (SM aft port)  
04/04/08 -- ATV-1 undocking (from SM aft port)  
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05/02/08 -- STS-124/Discovery/1J undocking

05/14/08 -- Progress M-64/29P launch  
05/16/08 -- Progress M-64/29P docking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 08/22/07  
**Date:** Wednesday, August 22, 2007 1:36:00 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/22/07**

All ISS systems continue to function nominally, except those noted previously or below. *The crew is enjoying the third day of a three-day rest period.*

Today's main activity on board had CDR Yurchikhin supporting ground engineers in Moscow working on restarting the Russian TsVM (Central) and TVM (Terminal) computers, each of which comprises three processor "lanes", during RGS/RCT (Russian ground site/Russian Contingency Telemetry) passes. *[Each of the six individual lanes in turn was first powered off and connected to the new BOK-3 Command Processing Unit for preserving context data, followed by a restart of the respective computer to incorporate the context data. Thus, TsVM (SMCC) and TVM (SMTC) required three complete restarts each. During the activities, which lasted about 9 hrs, the U.S. ACS (Attitude Control System) was kept in TVM Restart Mode, later restored to nominal. TVM Restart Mode inhibits U.S. GNC {Guidance, Navigation & Control} Recovery & automatic handover to Russian MCS (Motion Control System) and enables Fail Caution on the Primary GNC MDM (Multiplexer/Demultiplexer). For the duration of the day-long restart activities, the C&C (Command & Control) MDM was also enabled to automatically acquire -- via its FDIR (Fault Detection, Isolation & Recovery) system -- each new SMCC lane as it became available.]*

After the computer restart activities, FE-1 Kotov supported the ground in reactivating the Elektron oxygen generator at 32 amps, monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Yurchikhin switched the Vozdukh CO<sub>2</sub> (Carbon Dioxide) removal system from

automatic mode, enabled yesterday, back to manual mode 5.

Working in the U.S. Airlock (A/L), FE-2 Anderson “cleaned up” after the recent spacewalks by disassembling and stowing the tools and gear used in the EVAs.

Afterwards, Anderson initiated the 85-day maintenance cycle on the first two EMU (Extravehicular Mobility Unit) batteries (#2063, #2041), required for the next spacewalk. *[The periodic maintenance consists of fully discharging and then recharging the storage units to prolong their useful life. After end of the maintenance cycle, Clay will restore the SSC laptop, which is used in DOS mode for the automated procedure, to nominal ops.]*

In preparation for upcoming EMU cooling loop scrubs (planned for 8/28), the FE-2 installed Fyodor’s EMU (#3006) in the Airlock’s aft EDDA (EMU Don Doff Assembly) and stowed his own (#3018) in the A/L.

Finishing up in “Quest”, Clay installed two METOX (Metal Oxide) CO<sub>2</sub> absorption canisters (#0016, #0019) in the regeneration oven for their subsequent bake-out process.

FE-1 Kotov conducted the periodic collection and logging of accumulated data of the six Matryoshka-R Bubble Dosimeter detectors installed on 8/16 at various exposure locations in the RS (Russian Segment), using the special Bubble Dosimeter Reader. *[The six detectors now in use were positioned in spherical “Phantom” containers, in the DC1 (Docking Compartment) and close to the maintenance work table next to the Matryoshka’s MOSFET (metal oxide semiconductor field-effect transistor) dosimeter sensor.]*

For the upcoming deployment of the IMS (Inventory Management System) application on crew PDAs, Oleg installed an uplinked SSC (Station Support Computer) Client Service Pack.

Clay Anderson continued his support of the EPO (Educational Program Operation) “Kit C” project by conducting his first check-and-photo activity. The demo experiment studies the growth of basil and lettuce in zero-G, in support of an Engineering Design challenge for students at Nebraska and Iowa State Universities. *[During the 20-day run, Clay takes still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20, whereas the plants will be watered on all odd numbered days. To determine if the plants need water, Clay looks in a viewport to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation, it’ll be crew’s choice as to whether or not*

*the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

Yurchikhin completed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the periodic checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

Oleg Kotov performed the periodic data collection and downlink on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse. As a discretionary task from the RS "time permitting" job list, the FE-1 also conducted the regular health check on the fans of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS, using the hand to check for air flow of three control box fans and six fans of MID-Lada module.

As a second voluntary task, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

Payload operators uplinked a number of short MELFI (Minus-Eighty Laboratory Freezer for ISS) configuration activities to Clay Anderson's discretionary "job jar" task list, to be hard-scheduled over the next several weeks. They are required to get MELFI and its samples and ICEPACs in the correct configuration to maximize success for 10A (and beyond) sample packing and return.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later, Clay will download the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~9:25am EDT, Anderson held a private crew-choice audio event on S-band.

Later, at ~1:25pm, Clay also conducted his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

Today's CEO (Crew Earth Observation) photo targets were **33 Licancabur Volcano, Chile** (*CREW REQUEST: This locally well-known cone is located just southwest of a prominent small green lake, Laguna Verde. Aiming right of track. If the crew shot a continuous mapping swath, they should have caught the volcano which lies on the edge of the Andes Mountains. The summit crater contains a 70 x 90 m crater lake which is ice-covered most of the year. This is one of the highest lakes in the world, and despite air temperatures which can drop to -30 °C, it contains planktonic fauna. This and similar lakes are used by astrobiologists as analogs for possible life-sustaining environments on Mars*), and **Hurricane Dean, Gulf of Mexico** (*DYNAMIC EVENT: The large cloud mass of this well-formed storm was right of track, as the storm makes landfall on the Gulf coast of Mexico. The crew was to try to include any coastlines or mountain ranges in a wide-angle view. Dean has raked Jamaica and the Yucatan peninsula with Category 4 and 5 winds.*)

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:14am EDT [= epoch]):

Mean altitude -- 341.3 km

Apogee height -- 346.7 km

Perigee height -- 335.9 km

Period -- 91.36 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008042

Solar Beta Angle -- -14.7 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 10

Revolutions since FGB/Zarya launch (Nov. 98) -- 50124

**Significant Events Ahead** (all dates Eastern and subject to change):

08/29/07 -- ISS reboost (if required)

08/29/07 -- SSRMS setup for viewing PMA-3 relocation

08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

09/??/07 -- Progress M-60/25P undocking (SM aft port) [under review]

09/20/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate  
10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/5-8/07 -- Node 2 relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/17/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 [to be reviewed]  
02/12/08 -- Progress M-63/28P launch [to be reviewed]  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/21/07  
**Date:** Tuesday, August 21, 2007 2:28:24 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/21/07**

All ISS systems continue to function nominally, except those noted previously or below.

After 12d 17h 57min in space, **STS-118/Endeavour today returned to Earth**, touching down at KSC on the first landing opportunity at 12:33pm EDT, after 201 orbits, over 5.2 million miles, and a perfect ISS 13A.1 mission, during which its seven-member crew conducted four EVAs, delivered & installed the Starboard-5 (S5) spacer truss, replaced Control Moment Gyroscope 3 (CMG-3), brought resupply, functionally verified the new SSPTS (Station-to-Shuttle Power Transfer System), “deployed” the first Teacher in Space, Astronaut Barbara Morgan, etc. Also, Endeavour also used its Shuttle-only “downmass” capability to return high-value samples from three physiological/human research experiments (Nutrition, SWAB, SPEGIS), two materials exposure payloads (MISSE 3 & 4), three different plant growth experiments (CGBA-CSI-01, Gravi, Tropi), plus data & hardware from three other experiments (CFE, FOOT, EMCH). It was the 119<sup>th</sup> flight of a Space Shuttle and the 22<sup>nd</sup> shuttle mission to visit the station. *Welcome back, Endeavour, on your 20<sup>th</sup> flight! Next up: STS-120/Discovery in October.*

Aboard the station, the crew is enjoying the second day of three days “recess”. Sleep cycle has now shifted back to the standard wakeup at ~2:00am EDT and 5:30pm bedtime.

The three crewmembers conducted the regular weekly three-hour task of thorough station cleaning. [*“Uborka”, normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency*

*particulate air) bacteria filters in the Lab.]*

In the SM, CDR Yurchikhin worked on the Vozdukh carbon dioxide (CO<sub>2</sub>) removal system, readying two GA (gas analyzer) CO<sub>2</sub> sensors behind Panel 241 and later switching the Vozdukh to automatic mode. *[In automatic mode, Vozdukh is controlled by the SM's BVS onboard computer complex in conjunction with the BA automatic control unit, operating in closed-loop control with the IK0501 gas analyzer. The IK0501 was successfully serviced by Oleg Kotov on 8/8 and recalibrated by MCC-Moscow, with the U.S. MCA (Major Constituent Analyzer) as check.]*

After setting up, watering and videoing the new EPO (Educational Payload Operation) engineering design project called Kit C, which studies the growth of basil and lettuce in zero-G, FE-2 Anderson today captured still images of the plants, to be used on the engineering design challenge website. *[For the two plant species, Clay suggested a competition between the two participating Universities (Nebraska & Iowa State), i.e., "Huskers" vs. "Cyclones". During the 20-day run, Clay will take still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20. On all odd numbered days, the plants will be watered. To determine if plants need water, Clay looks in a viewport to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the pooling. At the conclusion of the 20-day investigation, it'll be crew's choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

*Saturday Science Preview:* Four optional activities for the voluntary "Saturday Science" program on 8/25 & 26 were suggested to Clay for his choice. His selection is required by tonight. *[The four choices are (1) video of the Plant Growth EPO, (2) a new run of CFE VG1 (Capillary Flow Experiment – Vane Gap 1) to complete the CFE-VG1 experiment, (3) SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites), flying two and three satellites, requiring CDRA (CO<sub>2</sub> Removal Assembly) to be running, and (4) BCAT-3 (Binary Colloidal Alloy Test 3), using the CGBA-4 (Commercial Generic Bioprocessing Apparatus 4).]*

CDR Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later, Clay will download the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

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Apogee height -- 346.7 km

Perigee height -- 335.9 km

Period -- 91.36 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008042

Solar Beta Angle -- -10.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 88

Revolutions since FGB/Zarya launch (Nov. 98) -- 50109

**Significant Events Ahead** (all dates Eastern and subject to change):

08/29/07 -- ISS reboost (if required)

08/29/07 -- SSRMS setup for viewing PMA-3 relocation

08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

09/??/07 -- Progress M-60/25P undocking (SM aft port) [under review]

09/20/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate

10/25/07 -- STS-120/Discovery/10A docking

11/03/07 -- STS-120/Discovery/10A undocking

11/5-8/07 -- Node 2 relocation; PMA2 relocation

11/13/07 -- US EVA-10

11/17/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 [to be reviewed]  
02/12/08 -- Progress M-63/28P launch [to be reviewed]  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 08/20/07  
**Date:** Monday, August 20, 2007 12:54:40 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/20/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 13 for STS-118. Underway: Week 18 of Increment 15.*

Aboard the station, the crew is enjoying a light-duty day. After wakeup at ~4:00am EDT (shifting now to the left), CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Clay Anderson were mostly occupied with cleaning up after the Shuttle guests. *[Sleep time tonight: 5:30pm.]*

FE-1 Kotov took the periodic sensor readings of the Russian "Pille-MKS" (MKS = ISS) radiation dosimetry experiment which has ten sensors placed at various locations in the Russian segment (port cabin window, starboard cabin window, ASU toilet facility, control panel, etc.). Nine of the ten dosimeters are read manually (last time done: 7/16/07).

FE-2 Anderson reconfigured the SSRMS (Space Station Remote Manipulator System) video setup by disconnecting the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable at the Cupola & Lab RWS (Robotics Work Station).

Later today, the FE-2 will also disconnect the EXPRESS Rack 1 (ER1) jumper from the ITCS (Internal Thermal Control System).

Anderson began an extended activity with an EPO (Educational Payload Operation) demo project called Kit C, dealing with the growth of basil and lettuce in zero-G. Today's task was to set up the payload and add water (~180 ml) to each of the growth chambers. *[During the course of the 20-day run, Clay will take still imagery of the growth chambers on all even numbered day (2, 4, 6...) through day 20. On all odd numbered days, the plants will be watered. To determine if plants need water, Clay will look in a view port to see if water is pooling; if so, he is to attach a syringe to the plant growth chamber and draw out enough water to alleviate the*

*pooling. At the conclusion of the 20-day investigation, it'll be crew's choice as to whether or not the plant growing should be continued. If so chosen, downlinking of further still images will be appreciated on the ground.]*

CDR Yurchikhin completed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM).

Anderson completed the periodic CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout on the prime unit (#1060) and backup unit (#1057). *[Clay changed out the prime unit's battery, then zero-calibrated both instruments. Following zero calibration, the backup unit was stowed, while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

The FE-2 also distributed and stowed the new STS-118 delivered SODF (Station Operation Data File) procedures books for Stage 13A.1. *[The print material typically includes three new Emer-1 (Emergency 1, red cover) books, POC (Portable Onboard Computer) manual changeout pages, Medical checklist & cue cards, a Lab window shutter constraint cue card, a Leak Pinpoint Procedures book, a Contingency Jumper Procedures book, and an EMU Integrated System Schematic.]*

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later, Clay will download the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*Hurricane Dean Update:* As of this morning, the projected track of the storm takes it well south of Johnson Space Center onto Yucatan, and JSC remains open. As a result, MCC-H and the Shuttle's MER (Mission Evaluation Room) continue nominal operations in support of the mission.

**STS-118 landing** at KSC is set for tomorrow (8/21, Tuesday) at ~12:31pm EDT, after de-orbit burn at 11:24am on Revolution (Rev) 201, weather permitting. There are one alternative (wave-off) opportunity at KSC (Rev 202, deorbit burn TIG (time of ignition)-12:59pm; land-2:06pm), plus two opportunities at EDW (Rev 203: TIG-2:30pm, land-3:36pm; and Rev 204: TIG-4:05pm, land-5:11pm EDT). A 24-hour

delayed deorbit for KSC is possible on Rev 217, at TIG = 11:52am. *[If the landing occurs at KSC on the 1<sup>st</sup> opportunity as planned, Endeavour's mission duration will have been 12d 17h 55m. For the 2<sup>nd</sup> opportunity landing (rev 202), duration would be 12d 19h 30m.]*

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Perigee height -- 336.1 km

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Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007909

Solar Beta Angle -- -5.5 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 235

Revolutions since FGB/Zarya launch (Nov. 98) -- 50093

**Significant Events Ahead** (all dates Eastern and subject to change):

08/21/07 -- STS-118/Endeavour/13A.1 landing, ~12:31pm (other opportunities see above)

08/29/07 -- ISS reboost (if required)

08/29/07 -- SSRMS setup for viewing PMA-3 relocation

08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

09/??/07 -- Progress M-60/25P undocking (SM aft port) [under review]

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11/03/07 -- STS-120/Discovery/10A undocking

11/5-8/07 -- Node 2 relocation; PMA2 relocation

11/13/07 -- US EVA-10

11/17/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
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02/??/08 -- Russian EVA-20 [to be reviewed]  
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02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/19/07  
**Date:** Sunday, August 19, 2007 2:05:04 PM  
**Attachments:**

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**ISS On-Orbit Status 08/19/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 12 for STS-118. Sunday. Ahead: Week 18 of Increment 15. [Flight Control to ISS crew: “We all join you in wishing farewell to our STS 118 crew. It’s been an awesome week and a half, with a fabulous job of working together, Robotic operations, 4 EVAs and all of their logistics, tons of transfer, PAO events, several R&Rs, comm. troubleshooting, special photos, timeline updates, and especially a timely, coordinated and successful execution of a very ambitious plan. All we can say about you gentlemen is “Wow!” We are very impressed and wish you a heartfelt “thank you.””]*

**STS-118/Endeavour and ISS are flying in separate orbits again.**

After final preparations on both sides of the hatches (closed last night at 5:10pm EDT), Endeavour undocked smoothly from PMA-2 (Pressurized Mating Adapter 2) this morning at 7:57am, after a total docked time of 8d 17h 45min. *[For undocking, the station was turned 180 deg to +XVV ZLV (+x-axis in velocity vector, z-axis in local vertical) at 6:46am, put briefly on free drift for the undocking, and then maneuvered to 13A.1 Stage attitude of +XVV TEA attitude at 8:49am.]*

KSC landing is nominally expected on 8/21 (Tuesday) at ~12:30pm EDT (unless moved to 8/22 {11:52am at KSC}).

Aboard the station, the crew is enjoying a light-duty day. After wakeup at ~4:37am, CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Clay Anderson, went through last-minute preparations for the undocking. *[Sleep time tonight: 7:30pm.]*

FE-1 Kotov made sure that the Lab science window was shuttered for protection against jet plumes during the undocking.

Before and during the undocking, Kotov stood by at a laptop with a stopwatch to

monitor the proper performance of automatic undocking software for the PMA-2 departure under Russian thruster control. *[The procedure provides for the crewmember to take over the automatic operational attitude control sequence manually if the software does not resume control after the period of free drift a few minutes after physical separation.]*

Anderson later powered down the Airlock and Lab Cupola PCS (Portable Computer System) A31p laptops, no longer required for now.

Assisted by Kotov, Fyodor Yurchikhin later depressurized the PMA-2 to prevent humidity condensation and pressure fluctuations. Leak checking by Clay followed for the standard one hour. Afterwards, the necessary equipment was torn down.

After Yurchikhin had shot video footage of the undocking, FE-2 Anderson reconfigured the VDS VTR (Video Distribution System/Video Tape Recorder) bypass cables into a nominal undocked operations configuration. *[On 8/9, Clay had connected the bypass cables for passing video to and from the station on the Lab's starboard side and allowing the station to receive video from the Orbiter on the Lab's port side.]*

The FE-2 also disassembled and stowed the BPSMU (Battery Powered Speaker Microphone Unit) with its drag-through cable and QDs (quick disconnects) along with video adapter cables, all used by the Shuttle crew during the docked phase with the Orbiter.

Oleg Kotov did the reconfiguration of the Russian telephone/telegraph subsystem (STTS) to its post-undocking settings, from its primary string back to nominal mode on the backup string. This also severed the VHS (UHF) channel to the receding Shuttle Orbiter and restored the RSA-2 S/G (Space-to-Ground) comm configuration on Panel 3. *[The "Voskhod-M" STTS enables telephone communications between the SM, FGB, DC1 Docking Compartment and U.S. segment (USOS), and also with users on the ground over VHF channels selected by an operator at an SM comm panel, via STTS antennas on the SM's outside. There are six comm panels in the SM with pushbuttons for accessing any of three audio channels, plus an intercom channel. Other modes of the STTS include telegraphy (teletype), EVA voice, emergency alarms, Packet/Email, and TORU docking support.]*

After yesterday's shortened EVA-4, Clay Anderson took another session of the standard Russian crew health-monitoring program's medical assessment MO-9/ Biochemical Urinalysis. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the*

*sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

Later, as standard post-EVA health status checkup, Clay also took the general U.S. PFE (Periodic Fitness Evaluation), assisted by Oleg Kotov as CMO (Crew Medical Officer), a 20-min procedure to check up on general crewmember health before/after the spacewalk. *[Cardiovascular readings were logged by Oleg on the MEC's IFEP software. Later, Anderson also linked up with the ground via Ku- and S-band with NetMeeting/video for the usual private medical conference (PMC).]*

In the "Quest" Airlock, the FE-2 performed the usual post-EVA water recharge of the EMU (Extravehicular Mobility Unit) cooling water tanks. Clay also took another set of digital photos of the gloves used by him and Dave during EVA-4 for subsequent downlink.

The FE-1 spent about 30 min. of equipment servicing in the ASU toilet facility, changing out two urine receptacles (PR & MP) and a filter insert (F-V).

Oleg also completed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM.

In the "Unity" Node, the CDR cleaned the Smoke Detector #2 (SD-2).

Afterwards, working on the IMS (Inventory Management System), Fyodor updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Afterwards, the CDR copied the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

#### *Consumables Transfers Update:*

- Total quantity of Supply Water transferred to ISS for the mission: 918.6 lbm (416.6 L):
  - Water transferred in eight CWCs (Contingency Water Containers): 778.9 lbs (353.2 L), all treated with biocide, two also with minerals;

- water samples were collected during five fills;
  - Water transferred in seven PWRs (Payload Water Reservoirs, incl. for OGS): 139.7 lbm (63.4 L); 1 OGS PWR was filled twice to support OGS operations. PWR fills #3 and #7 were the OGS PWRs;
- Oxygen (O<sub>2</sub>) transferred = 77 lbm (34.9 kg) of O<sub>2</sub>.
- Nitrogen (N<sub>2</sub>) transferred = 33.8 lbm (15.3 kg) of N<sub>2</sub>.
- Lithium Hydroxide (LiOH) transferred: ISS to Shuttle = 12 canisters; Shuttle to ISS = 30 cans.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 10:13am EDT [= epoch]):

Mean altitude -- 341.6 km

Apogee height -- 347.0 km

Perigee height -- 336.2 km

Period -- 91.37 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008084

Solar Beta Angle -- -0.7 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude gain in the last 24 hours -- 290

Revolutions since FGB/Zarya launch (Nov. 98) -- 50078

**Significant Events Ahead** (all dates Eastern and subject to change):

08/21/07 -- STS-118/Endeavour/13A.1 landing, ~12:30pm (or 8/22 if no Dean evacuation of JSC)

08/29/07 -- SSRMS setup for viewing PMA-3 relocation

08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

09/??/07 -- Progress M-60/25P undocking (SM aft port) [under review]

09/20/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 “Harmony”, racks; P6 relocate

10/25/07 -- STS-120/Discovery/10A docking

11/03/07 -- STS-120/Discovery/10A undocking  
11/5-8/07 -- Node 2 relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/17/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 [to be reviewed]  
02/12/08 -- Progress M-63/28P launch [to be reviewed]  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
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04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/18/07  
**Date:** Saturday, August 18, 2007 8:21:55 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/18/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 11 for STS-118; Day 9 of Joint Ops.*

**>>> Mission 13A.1 has been replanned because of Hurricane Dean, forecast for landfall on the South Texas coast on 8/23 (Thursday). A decision to close JSC on FD13 or not is to be made tomorrow, Sunday (8/19), at 1:00pm EDT. STS-118/Endeavour would then land on FD14, i.e., one day early on 8/21 (Tuesday). Consequently, today's EVA-4 was reduced in length by dropping two objectives to protect for Endeavour undocking on FD12 (Sunday, 8/19) morning.**

Wakeup time for the ISS crew was at 5:07am EDT, with bedtime half an hour earlier than yesterday, at 8:07pm (Shuttle crew: 8:37pm).

Today's **EVA-4 was completed** as re-planned. Shuttle MS3 Dave Williams (EV2) and ISS FE-2 Clay Anderson (EV3) –

- Installed the OBSS OSE (Orbiter Boom Sensor System/Orbital Support Equipment) install on S1 truss Zenith trunnions,
- Engaged the Z1 SASA (S-band Antenna Support Assembly) Gimbal Locks (deferred from EVA #3),
- Retrieved the MISSE-3 & -4 (Materials ISS Experiment 3&4) payloads (deferred from EVA #3),
- Installed the EWIS (External Wireless Instrumentation System) antennas on the U.S. Lab,
- Cleaned Up.

*[Official start time of the spacewalk was 9:17am EDT (45 minutes ahead of schedule). It ended at 2:19pm, for a total EVA duration (PET = Phase Elapsed Time) of 5h 02m. It was the 92<sup>nd</sup> spacewalk for ISS assembly & maintenance and*

*the 64<sup>th</sup> from the station (28 from Shuttle, 42 from Quest, 22 from Pirs) totaling 380h 38m. After today's EVA, a total of 105 spacewalkers (75 NASA astronauts, 20 Russians, and ten astronauts representing Japan-1, Canada-4, France-1, Germany-1 and Sweden-3) have logged a total of 568h 02m outside the station on building, outfitting and servicing. It also was the 114<sup>th</sup> spacewalk by U.S. astronauts.]*

After the 8.5-hr sleep period before the spacewalk, the CL (Crewlock) hatch was cracked for a one-hour hygiene break w/mask prebreathe for Williams & Anderson, after they spent the night on 10.2 psi campout. The hatch was then closed again for a continued depress period at 10.2 psi. EMU purging began ~7:27am, followed by spacesuit pre-breathe period at ~7:42am. Airlock depressurization started at ~8:32am.

Post-EVA activities included the standard spacesuit servicing, disassembly of the MISSE payloads, transfer of MISSE and the Shuttle spacesuits to Endeavour and completing the remainder of cargo transfer Shuttle to ISS and ISS to Shuttle.

CDR Yurchikhin and FE-1 Kotov reviewed CB (Cold Bag) handling instruction, then packed and transferred two DCBs (Double CBs). *[Return of the DCBs on 13A.1 has high priority since the downmass for 10A is already full, and MELFI (Minus-Eighty Laboratory Freezer for ISS) can only hold a limited number of ice packs.]*

First thing in the morning, MS5 Alvin Drew performed an R&R (Removal & Replacement) on the CEVIS (Cycle Ergometer with Vibration Isolation System) in the Lab, replacing the Display Cable and the Ergometer itself. Oleg Kotov then completed the standard calibration and checkout exercise. *[The Manual Control Knob was removed and stowed on ISS. Kotov calibrated the CEVIS Display/Control Panel to the Ergometer using Clay Anderson's new CEVIS PCMCIA memory card (#1026). He then performed an exercise session using an automated "test" protocol. Afterwards, Oleg downlinked the data to the MEC (Medical Equipment Computer), to allow ground engineers to review the data before returning to nominal CEVIS operations.]*

Fyodor Yurchikhin repaired an SKV-2 air conditioner ventilation airduct for the VTK-2 fan that was found yesterday to be rotted due to humidity.

Preparatory to potable water transfer from Progress M-61/26P, Yurchikhin initiated the compression of the SM's Rodnik BV1 tank bladder to check for leak tightness (hermeticity). *[Each of the spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before receiving the liquid waste.]*

FE-1 Kotov exchanged the tape in the VTR (Video Tape Recorder).

Oleg also tore down and stowed the equipment used for transferring oxygen (O<sub>2</sub>) from Shuttle to ISS.

It was Kotov's turn today for his third session with the Russian experiment DYKHANIE ("respiration", "breathing"), tagged up with ground specialists and conducted the session, later closing down and stowing the equipment. *[Dykhanie-1 gear uses two belts (PG-T/thoracic, PG-A/abdominal), a calibrator, resistor, mouthpiece, etc., to study fundamental physiological mechanisms of the external breathing function of crewmembers under long-duration orbital flight conditions. During the experiment, physiological measurements are taken and recorded with a pneumotachogram, a thoracic pneumogram, an abdominal pneumogram, and pressure data in the oral cavity. All experimentally derived plus salient environmental data along with personal data of the subject are recorded on PCMIA card for return to the ground at end of the Expedition. Objectives include determining the dynamics of the relationship between thoracic (pectoral) and abdominal breathing function reserves and their realization potential during spontaneous breathing, the coordinated spontaneous respiratory movements in terms of thoracic and abdominal components of volumetric, time & rate parameters of spontaneous respiratory cycle, identification of the features of humoral-reflex regulation of breathing by dynamics of ventilation sensitivity of thoracic and abdominal components to chemoreceptor stimuli, etc. Overall, the experiment is intended to provide a better understanding of the basic mechanisms of pulmonary respiration/gas exchange gravitational relations of cosmonauts.]*

The FE-1 also completed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the periodic (currently daily) checkout/verification of IP-1 airflow sensors in the various RS (Russian segment) hatch openings (8) in the SM, FGB and DC1. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently ten persons.]*

Working on the IMS (Inventory Management System), Oleg updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-1/checkout), TVIS treadmill (CDR, FE-1, FE-2), RED resistive

exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Afterwards, Oleg copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The traditional **Farewell** ceremony between ISS crew and the departing Shuttle astronauts took place at ~4:47pm. Shuttle/ISS airduct disassembly and **hatch closing** was complete at 5:10pm. Undocking of Endeavour from PMA-2 is scheduled tomorrow morning at 7:57am EDT, after a total docked time of 8d 17h 45min. Landing is expected on 8/21 (Tuesday). *See below.*

Working off the discretionary job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A second item on the "time permitting" task list for Oleg today was the periodic status check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse, including a health check on the fans of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS, using the hand to check for air flow of three control box fans and six fans of MID-Lada module. *[Rasteniya-1 examines a variety of different types of plants over multiple generations on ISS.]*

*DAIU Update:* Troubleshooting was performed yesterday on the Docked Audio Interface Unit, including scopemeter measurements of laptop-generated tones. The problem appears to be a wiring issue between PMA-2 and the Lab, and not a DAIU problem.

#### *Hurricane Response Strategy:*

- If NASA JSC closes, two Flight Control Teams (one for Planning and one for Entry team) will remain in place to support landing only. The Orbiter will land on Tuesday at one of the three primary landing sites (KSC, EDW, or White Sands).
- If JSC remains open, a normal entry strategy will be in effect (i.e., trying for KSC-only on Tuesday).
- Should landing not occur on Tuesday and JSC is still threatened, an Entry Team will be sent to KSC to activate the Emergency MCC.
- If JSC is not threatened, MCC-H will continue to operate with a landing on

8/22 (Wednesday).

- For the station, the ISS Flight Control Team support will transition to BCC (Backup Control Center) operations. Tomorrow at 1:00pm EDT JSC management will review the threat to the Center and any decision regarding closure.

### **Weekly Science Update** (*Expedition Fifteen -- 17<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* On 8/7, data file from test was downlinked. Data analysis shows nominal performance of ALTEINO device. Next ALTCRISS activity is currently scheduled for 8/27.

*ANITA:* Planned.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2:* Next session scheduled around 9/10.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS):* Continuing,

*CFE (Capillary Flow Experiment):* Reserve.

*CHROMOSOME-2 (E14 SFP):* Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* Powered off. Waiting to support other experiments such as BCAT.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* Powered off.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Next scheduled operation is 10/29-11/3.

*EMCH (Elastic Memory Composite Hinge):* Complete.

*EPO (Educational Payload Operation) Kit C:* Planned.

*IMMUNO (Saliva Sampling):* First session samples are currently stowed in MELFI Dewar #2.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* Samples uploaded on 13A.1 and transferred to ISS. Start of MULTIGEN experiment is currently scheduled in Week 18.

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* Planned.

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION:* Planned.

*PMDIS (Perceptual Motor Deficits in Space):* Al Drew and Dave Williams each completed a data session on ISS. "CSA is delighted that crew time was made available for that experiment. We thank profusely the two astronauts for their time and dedication to complete the experiment. We also extend our sincere thanks to Clay Anderson who was instrumental in setting up & stowing the hardware and for installing the camera. Once the CDs are back on Earth, they will be going to our PI at York University to verify if data recorded properly and if data can be analyzed."

*SAMPLE:* Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* SAMS and MAMS were activated on 8/8 and are collecting acceleration data in support of joint ops. The SAMS ICU locked up late on 8/8, but was recovered on 8/9 after a laptop reboot by the crew.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Clay Anderson will have his third Actiwatch download and initialization session tomorrow.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Planned.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* No change from last week.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

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**ISS Orbit** (as of this morning, 7:41am EDT [= epoch]):

Mean altitude -- 341.4 km

Apogee height -- 346.6 km

Perigee height -- 336.1 km

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Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007846

Solar Beta Angle -- 9.0 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 100

Revolutions since FGB/Zarya launch (Nov. 98) -- 50044

**Significant Events Ahead** (all dates Eastern and subject to change):

08/19/07 -- STS-118/Endeavour/13A.1 undocking (7:57am)

08/21/07 -- STS-118/Endeavour/13A.1 landing (or 8/22 if no hurricane evacuation of JSC)

08/29/07 -- SSRMS setup for viewing PMA-3 relocation

08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

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11/03/07 -- STS-120/Discovery/10A undocking

11/5-8/07 -- Node 2 relocation; PMA2 relocation

11/13/07 -- US EVA-10

11/17/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking

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04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/17/07  
**Date:** Friday, August 17, 2007 12:31:52 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 08/17/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 10 for STS-118; Day 8 of Joint Ops.*

Wakeup time for the ISS crew shifted half an hour earlier, to 5:07am EDT, with bedtime remaining at 8:37pm (Shuttle crew: 9:07pm).

In preparation for tomorrow's EVA-4, FE-2 Anderson, before breakfast, took another session of the standard Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

Later, as standard pre-EVA health status checkup, Clay Anderson also took the general U.S. PFE (Periodic Fitness Evaluation), assisted by Oleg Kotov as CMO (Crew Medical Officer), a 20-min procedure to check up on general crewmember health before/after the spacewalk. *[Cardiovascular readings were logged by Oleg on the MEC's IFEP software. Tonight, before starting Campout, also links up with the ground via Ku- and S-band with NetMeeting/video for the usual private medical conference (PMC).]*

The CDR, FE-1 and FE-2 participated in the Shuttle crew's on-going troubleshooting of the DAUI (Docked Audio Interface Unit) which today required equipment setup, voice checks & safing, removal of a Lab smoke detector and OGS Feedwater System to rotate the Lab OGS rack, DAUI activation and voice checks.

*[The ISS C&T (Communications & Tracking) audio system has experienced off-nominal performance during numerous docked Orbiter operations. Currently suspects, to be investigated, are either the DAUI itself or the wiring or the APAS (Androgynous Peripheral Attach System) docking ring electrical connector (which transfers the voice signal from Shuttle to Station, and may have contamination). Yesterday, a test was performed to determine if the hard line audio on A/G1 (Air-to-Ground 1), A/A (Air-to-Air) and ICOMA is functioning between the Shuttle and Station. The results were consistent with past Shuttle docked anomalies: no comm on Docked Air to Air (both from Station and Shuttle), no comm on Docked Air to Ground from Shuttle. Docked Air to Ground from Station works as expected.]*

CDR Yurchikhin set up the equipment for his third session with the Russian experiment DYKHANIE ("respiration", "breathing"), tagged up with ground specialists and conducted the session, later closing down and stowing the equipment. *[Dykhaniye-1 gear uses two belts (PG-T/thoracic, PG-A/abdominal), a calibrator, resistor, mouthpiece, etc., to study fundamental physiological mechanisms of the external breathing function of crewmembers under long-duration orbital flight conditions. During the experiment, physiological measurements are taken and recorded with a pneumotachogram, a thoracic pneumogram, an abdominal pneumogram, and pressure data in the oral cavity. All experimentally derived plus salient environmental data along with personal data of the subject are recorded on PCMIA card for return to the ground at end of the Expedition. Objectives include determining the dynamics of the relationship between thoracic (pectoral) and abdominal breathing function reserves and their realization potential during spontaneous breathing, the coordinated spontaneous respiratory movements in terms of thoracic and abdominal components of volumetric, time & rate parameters of spontaneous respiratory cycle, identification of the features of humoral-reflex regulation of breathing by dynamics of ventilation sensitivity of thoracic and abdominal components to chemoreceptor stimuli, etc. Overall, the experiment is intended to provide a better understanding of the basic mechanisms of pulmonary respiration/gas exchange gravitational relations of cosmonauts.]*

The CDR conducted the periodic/long-term visual inspection of the pressure hull in the Service Module (SM) Working Compartment (RO), behind panels 130, 134, 135, 138 and TVIS, looking for any moisture, deposits, mold, corrosion, cavities and pitting. *[Fyodor inspected the hull surface, which is coated with a primer and dark-green enamel, using cleaning napkins to wipe the area in question if required and reporting results to the ground.]*

Oleg Kotov completed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the periodic (currently daily) checkout/verification of IP-1 airflow sensors in the various RS (Russian segment) hatch openings (8) in the SM,

FGB and DC1. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently ten persons.]*

Working on the IMS (Inventory Management System), Oleg also updated/edited its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Kotov had another two hours reserved on the timeline for deinstalling and removing no longer used SUD (Motion Control System) equipment from the FGB module. *[The equipment, which was used to provide orientation to the vehicle at the inception of ISS operations when the FGB was the only ISS module in space, will be disposed of in Progress 25P. Its removal frees up valuable stowage space behind FGB panels. The new stowage spaces will be outfitted with stowage enclosures delivered on the ESA ATV-1 (European Space Agency/Automated Transfer Vehicle 1) “Jules Verne”, increasing the efficiency and accessibility of stowage in the FGB Zarya (“Dawn”, - **not** “Sunrise”!).]*

A special task was added for Yurchikhin and Kotov: repair of an SKV-2 air conditioner ventilation airduct that was found yesterday to be failed.

TsUP/Moscow today continued the two-day functionality testing of the Russian BOK-3 Command Processing Unit of the TVM/Terminal & TsVM/Central computers that was installed on 8/14. Crew intervention was not required. The testing is to ensure that all cable connections were properly established and verify full functionality of the unit itself. The test methodology has been developed for the first two days of testing, but it could take as much as a week depending on the initial results. *[Today, TsUP uplinked commands (no crew involvement) and all commanding and telemetry monitoring are being performed via RGS (Russian ground site) passes. Plans for further testing depend on results from the first two days. Also, while there are no plans to activate TORU, Russian ground controllers do plan to send some commands to the KURS antenna tomorrow. The antenna will not be activated, but controllers will verify that commands can be successfully sent to the antenna through the BOK-3.]*

For tomorrow’s EVA-4 by Dave Williams (EV2) & Clay Anderson (EV3), Kotov readied the DCS-760 cameras with their freshly charged batteries, while Clay removed Rick Mastracchio’s EV1 EMU from the Airlock (A/L) to replace it with Dave’s EV2 suit, then configured the A/L EL (Equipment Lock) for the Campout, and prepared the EVA tools. EVA-4 gloves have been approved for both spacewalkers.

After all preps for EVA-4, including a review of the timeline & procedures, the two

spacewalkers will begin their “campout” in the “Quest” A/L, starting mask prebreathe at ~7:32pm, then closing hatches and initiating depressurization of the CL (Crewlock) from 14.7 to 10.2 psi. Sleep for the ISS crew will commence at 8:37pm, for the Shuttle crew at ~9:07pm.

The planned timeline for EVA-4 tomorrow is as follows:

- Hygiene Break (5:47am EDT)
- Campout EVA Prep (6:57am)
- Transfer Ops (8:27am)
- Egress EVA #4 (10:07am)
- OBSS OSE (Orbiter Boom Sensor System/Orbital Support Equipment) install on S1 truss (10:22am)
- Z1 SASA Gimbal Locks engage
- MISSE 3&4 retrieval (11:22am)
- EWIS Antenna install (12:07pm)
- Lab MMOD Shield cleanup (1:47pm)
- Node MMOD Shield cleanup (2:32pm)
- Sundry: AL TB Ops, P1 RBVM MLI (3:17pm)
- Cleanup 3:47pm
- Ingress EVA #4 (4:12pm)
- End of EVA-4 (4:37pm).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-1, FE-2), and VELO cycle with bungee cord load trainer (CDR).

Later tonight, Fyodor will copy the crew’s exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~7:50am, the ISS crew downlinked two PAO/TV addresses of greetings, one to the participants of the International Aerospace Salon MAKS-2007 at Baikonur, the other to key CIS antiterrorist and Special Forces personnel participating in a Baikonur-Anti-Terror-2005 Joint Operational & Strategic Commanding Staff Exercise (showing Antiterrorist Center pennants on board).

At ~1:12pm EDT, the ISS and Shuttle crew assembled in the SM for posing for the standard joint crew photograph.

Afterwards, at ~1:34pm, both crews supported a 40-min. news conference conducted with U.S. media at NASA centers (20 min.) and the Canadian Space

Agency (CSA) at CSA Headquarters in St. Hubert (20 min.). *[Media clients taped the event for use within their respective media outlets.]*

Working off the discretionary job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

**Cargo Transfer Update:** Transfer ops are ahead of schedule with 76% MDD (Middeck) and 79% SH (Spacehab) completed. Powered MDD payloads and transfers are on plan with 95% completion, except for MISSE3/4 retrieval and Cold Pack transfer. A total of 92 lbs of O2 (oxygen) was transferred from Shuttle to ISS HPGTs (High Pressure Gas Tanks).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:41am EDT [= epoch]):

Mean altitude -- 341.4 km

Apogee height -- 346.6 km

Perigee height -- 336.1 km

Period -- 91.36 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007846

Solar Beta Angle -- 9.0 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 100

Revolutions since FGB/Zarya launch (Nov. 98) -- 50044

**Significant Events Ahead** (all dates Eastern and subject to change):

08/18/07 -- EVA-4 (~10:07am)

08/20/07 -- STS-118/Endeavour/13A.1 undocking (8:00am)

08/22/07 -- STS-118/Endeavour/13A.1 landing (12:48pm)

08/29/07 -- SSRMS setup for viewing PMA-3 relocation

08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
09/??/07 -- Progress M-60/25P undocking (SM aft port) [under review]  
09/20/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate  
10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/5-8/07 -- Node 2 relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/17/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 [to be reviewed]  
02/12/08 -- Progress M-63/28P launch [to be reviewed]  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/16/07  
**Date:** Thursday, August 16, 2007 4:56:18 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/16/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 9 for STS-118; Day 7 of Joint Ops.*

Wakeup time for the ISS crew shifted half an hour earlier, to 5:37am EDT, with bedtime also half an hour earlier than yesterday, at 8:37pm (Shuttle crew: 9:07pm).

The IMMT (ISS Mission Management Team) has decided to switch timelines for Friday (8/17) and Saturday (8/18), with EVA-4 to be conducted no earlier than Saturday. A decision on a special Tile Repair EVA is expected by tonight. The tasks of MISSE retrieval and SASA Space Gimbal Locks engage, deferred from EVA-3, are being replanned.

FE-2 Clay Anderson worked a late-added 30-min. task of photographing his and Dave Williams' EVA gloves for comparison purposes for the ground to analyze "side by side". *[During yesterday's EVA-3, Rick Mastracchio noticed a 3/16-in. hole in the outer layer of his left glove, at 4h 17m into the spacewalk. Later, small pin holes were discovered also in the right glove. The spacewalk was terminated consistent with flight rule established following Bob Curbeam's glove damage on STS-116. There was no leak of the bladder seal barrier. Preliminary analysis suggests abrasion rather than a cut. EV1 had not identified damage during prior inspection and was unable to identify a specific event which might have caused the damage, which occurred during CETA cart relocation and ATFR setup. Ground specialists are reviewing video and photos to determine when and how the damage occurred. They are also reviewing worksites and tools for EVA-4 and a possible Tile Repair EVA for commonality with EVA-3 tools and procedures. EV1 will use backup gloves for future EVAs during this mission. A decision on a "glove rationale" for continuing EVA-4 and potential Tile Repair EVA is expected tonight or tomorrow.]*

With CDR Yurchikhin providing support, TsUP/Moscow today began two-day

functionality testing of the Russian BOK-3 Command Processing Unit of the TVM/ Terminal & TsVM/Central computers that was installed on 8/14. The testing is to ensure that all cable connections were properly established and verify full functionality of the unit itself. The test methodology has been developed for the first two days of testing, but it could take as much as a week depending on the initial results. *[Today, the CDR sent various commands through the BOK-3 unit to verify they reach the proper destinations. The ground will also uplink commands, and all will be monitored via RGS (Russian ground site) passes. Tomorrow, TsUP will uplink commands (no crew involvement) and all commanding and telemetry monitoring will be performed via RGS passes in order to deconflict with US EVA activities. Plans for further testing depend on results from the first two days. Also, while there are no plans to activate TORU, Russian ground controllers do plan to send some commands to the KURS antenna tomorrow. The antenna will not be activated, but controllers will verify that commands can be successfully sent to the antenna through the BOK-3.]*

FE-2 Anderson, MS4 Barbara Morgan and MS5 Alvin Drew unstowed the equipment of the EPO (Educational Payload Operation) demo SEEDS and worked on capturing video and still imagery of the seeds in the micro-G environment to share with students and educators. *[This is part of an engineering design challenge aimed at having students design, build, and evaluate their own plant growth chamber for future missions to the Moon. Students will use the images of the seeds to assist in evaluating their designs.]*

Yurchikhin retrieved a protective EVA hatch window cover from stowage and installed it on the forward window hatch window of the Lab on the EVA side.

The CDR also performed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water collected in CWC #1078 from the Lab CCAA (Common Cabin Air Assembly) dehumidifier. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Clay Anderson and PLT Charley Hobaugh set up and configured the oxygen (O<sub>2</sub>) transfer equipment for transferring O<sub>2</sub> from the Shuttle to the two HPGTs (High Pressure Gas Tanks) at the outside of the A/L (Airlock). *[N<sub>2</sub> (nitrogen) gas has been transferred earlier.]*

FE-1 Kotov meanwhile retrieved the OGS PWR (Oxygen Generation System/ Payload Water Reservoir) from the OGS rack front (LAB1P1) and temporarily

stowed it near the Shuttle galley, for its later refilling with Shuttle water and transfer back to the ISS.

In the "Quest" A/L, Anderson terminated the regeneration of the first METOX (Metal Oxide) CO<sub>2</sub> absorption canister, started yesterday, and initiated the bake-out process on the second METOX can. Afterwards, Clay also terminated and initiated the recharge of the EMU (Extravehicular Mobility Unit) batteries in the BSA (Battery Stowage Assembly). In addition, Anderson was to reattempt charging a PGT (Pistol Grip Tool) battery which did not charge properly yesterday due to an issue with BC2 CH3 (Battery Charger 2/Channel 3)

The CDR conducted the periodic verification of IMV (intermodular ventilation) airflow between the U.S. (USOS) and Russian segment (RS) by taking air flow measurements using the Velocicalc meter. *[There is no direct measurement of airflow except as reflected by differences in atmosphere partial pressures measured between the RS and USOS. ppCO<sub>2</sub> (CO<sub>2</sub> partial pressure) is a good yardstick since an increasing ppCO<sub>2</sub> in the Lab not reflected in the SM indicates that Vozdukh is not receiving the air from the Lab at an efficient rate. Periodic air flow degradation checks support establishing a most effective fan cleaning schedule.]*

Oleg Kotov collected the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Fyodor Yurchikhin had 75 min. to update the three SODF (Station Operation Data File) "Warning" Books in the Service Module (SM), FGB and Lab, replacing pages for post-EVA-3 conditions, discarding the old pages as trash, and restowing the books.

Starting a new round of the monthly preventive maintenance of RS ventilation systems, Kotov began in the FGB (*Funktsionalnyi-Grusovoi Blok*) with the regular cleanup of the detachable VT7 fan screen guards (grilles) of the TCS/SOTR (Thermal Control System)'s gas-liquid heat exchangers (GZhT4).

The FE-1 set up new Bubble dosimeters for recording radiation traces as an additional component of the RS radiation payload suite "Matryoshka-R". *[Using Velcro, the panel with the Bubble dosimeter reader was attached at the SM work site (on panel 107) and equipped with its own MMC memory card. Of eight Bubble dosimeter detectors supplied, six were initialized and positioned at their exposure*

*locations. The setup was photo-documented. The complex Matryoshka payload suite is designed for sophisticated radiation studies.]*

The CDR participated in the ongoing cargo transfers between Shuttle and ISS. *[As of last evening, transfer activities have been proceeding well: Middeck – about 72% complete; Spacehab – greater than 69% complete.]*

Continuing the extended leak checking of the spare BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator, the CDR today charged the unit once again with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#23). The last test pressurization was done by Yurchikhin on 6/18. *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

Fyodor completed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), Oleg updated/edited its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

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*FGB SUD Removal Update:* Yesterday’s removal of no longer used SUD (Motion Control System) equipment from the FGB module was not for return to Earth. The equipment, which was used to provide orientation to the vehicle at the inception of

ISS operations when the FGB was the only ISS module in space, will be disposed of in Progress 25P. Its removal frees up valuable stowage space behind FGB panels. The new stowage spaces will be outfitted with stowage enclosures delivered on the ESA ATV-1 (European Space Agency/Automated Transfer Vehicle 1) "Jules Verne", increasing the efficiency and accessibility of stowage in the FGB Zarya ("Dawn", - not "Sunrise!").

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

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Perigee height -- 336.3 km

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Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.000777

Solar Beta Angle -- 13.9 deg (magnitude decreasing)

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Mean altitude loss in the last 24 hours -- 60

Revolutions since FGB/Zarya launch (Nov. 98) -- 50027

**Significant Events Ahead** (all dates Eastern and subject to change):

08/18/07 -- EVA-4

08/20/07 -- STS-118/Endeavour/13A.1 undocking (8:00am)

08/22/07 -- STS-118/Endeavour/13A.1 landing (12:48pm)

08/29/07 -- SSRMS setup for viewing PMA-3 relocation

08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

09/??/07 -- Progress M-60/25P undocking (SM aft port) [under review]

09/20/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

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10/25/07 -- STS-120/Discovery/10A docking

11/03/07 -- STS-120/Discovery/10A undocking

11/5-8/07 -- Node 2 relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/17/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 [to be reviewed]  
02/12/08 -- Progress M-63/28P launch [to be reviewed]  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
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04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 08/15/07  
**Date:** Wednesday, August 15, 2007 4:43:38 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/15/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 8 for STS-118; Day 6 of Joint Ops.*

Wakeup time for the ISS crew remained at the current 6:07am EDT, with a bedtime half an hour earlier than yesterday, at 9:07pm (Shuttle crew: 9:37pm).

Today's EVA-3 was completed as scheduled, except for two objectives. Shuttle MS2 Rick Mastracchio (EV1) and ISS FE-2 Clay Anderson (EV3) –

- Relocated SASA (S-band Structural Assembly) from P6 to P1, in preparation for P6 truss relocation on 10A,
- Upgraded S-communications equipment by installing a new BSP (Baseband Signal Processor) & new XPDR (Transponder) at P1,
- Relocated, with SSRMS support, two CETA (Crew & Equipment Translation Aid) carts from the portside of the MT (Mobile Transporter) to the starboard side, required prior to P6 installation on 10A,
- Retrieved P6 XPDR, required prior to P6 relocation on 10A, for return for refurbishment as spare, and replaced it with a dummy box in its place, and
- Cleaned Up.

The spacewalk was cut short when EV1 Mastracchio discovered a small hole in the outer layer of the thumb of his left glove. There was no leakage, but per flight rules Rick returned to the Airlock and went on umbilical power. EV3 Anderson finished the retrieval of the P6 XPDR and returned also. Two scheduled tasks were not completed: (1) Engage Z1 SASA gimbal locks in preparation for SASA return on 10A, and (2) retrieve MISSE (Materials ISS Experiment) containers 3 & 4 for return on 13A.1 (Spacehab) after one year of exposure (installed during Expedition 13 on 8/3/06),

*[Official start time of the spacewalk was 10:37am EDT (30 min ahead of schedule). It ended at 4:05pm, for a total EVA duration (PET = Phase Elapsed Time) of 5h*

*28m. It was the 91<sup>st</sup> spacewalk for ISS assembly & maintenance and the 63<sup>rd</sup> from the station (28 from Shuttle, 38 from Quest, 22 from Pirs) totaling 375h 36m. After today's EVA, a total of 103 spacewalkers (73 NASA astronauts, 20 Russians, and ten astronauts representing Japan-1, Canada-4, France-1, Germany-1 and Sweden-3) have logged a total of 563h 0m outside the station on building, outfitting and servicing. It also was the 113<sup>th</sup> spacewalk by U.S. astronauts.]*

After the 8.5-hr sleep period before the spacewalk, the CL (Crewlock) hatch was cracked at ~6:45am EDT for a one-hour hygiene break w/mask prebreathe for Mastracchio and Anderson, after they spent the night on 10.2 psi campout. Around 7:57am, the hatch was closed again for a continued depress period at 10.2 psi.

During the EVA, PLT Hobaugh & FE-1 Kotov maneuvered the SSRMS in support of the SASA relocation from P6 to P1 and the CETA transfers from port to starboard.

As part of EVA preps, CDR Yurchikhin powered down the Ericsson amateur radio equipment in the FGB to prevent RF interference with the EMUs.

Yurchikhin had three hours reserved on the timeline for deinstalling and removing no longer used SUD (Motion Control System) equipment from the FGB module for return to Earth.

FE-1 Kotov terminated N<sub>2</sub> (nitrogen) transfer from the Orbiter to the ISS HPGTs (High-Pressure Gas Tanks) on the exterior of the U.S. Airlock (A/L) and tore down the transfer equipment/jumpers. *[A total of ~40 lbs of N<sub>2</sub> was transferred to the ISS until stopped by the counter pressure.]*

The CDR performed the regular monthly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), inspecting the condition of harnesses, belt slats, corner bracket ropes, IRBAs (Isolation Restorative Bungee Assemblies) and gyroscope wire ropes for any damage or defects, lubricating as required plus recording time & date values.

Yurchikhin also conducted the periodic (every two weeks) inspection of the RED (Resistive Exercise Device) with canister cords and accessory straps as well as the canister bolts for re-tightening if required.

Oleg Kotov completed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables and the periodic (currently daily) checkout/verification of IP-1 airflow sensors in the various RS (Russian segment) hatch openings (8) in the SM, FGB and DC1. *[This is especially important when the*

*ventilation/circulation system has to cope with a larger crew on board, currently ten persons.]*

Working on the IMS (Inventory Management System), Oleg also updated/edited its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The CDR participated in the ongoing cargo transfers between Shuttle and ISS. *[As of last evening, transfer activities have been proceeding well: Middeck – greater than 60% complete; Spacehab – greater than 40% complete.]*

Yurchikhin also configured and stocked the new 13A.1 CHeCS AMP (Crew Health Care Systems/Ambulatory Medical Pack) kits with items from the old AMP and Progress 26P cargo. Afterwards, Fyodor set up for PHS (Periodic Health Status) activities.

After A/L CL (Airlock Crewlock) repress and return of the spacewalkers, Clay Anderson and Scott Kelly completed the usual post-EVA activities in the A/L, including starting regeneration of the METOX (Metal Oxide) canister used for the Campout, recharging the EMU water tanks, starting EMU battery recharge, and downlinking the digital EVA photo/video imagery.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1), VELO cycle with bungee cord load trainer (CDR), and on the Shuttle equipment.

Later tonight, Fyodor will copy the crew’s exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off the discretionary job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

*MT Translation Event:* During last night’s scheduled translation from WS-7 (Work Site 7) to WS-4, the MT (Mobile Transporter) was halted unexpectedly by an “MT Overspeed” caution about 4 meters short of WS-4. After confirming that there were no indications of a hardware failure, as well as a photo survey to verify no

obstructions, the ground team successfully reset the translation drive and completed the translation manually. Specialists are investigating the cause of the over-speed message. No vehicle momentum or MSS (Mobile Service System) thermal issues were observed during the operations.

*ESP-3 Update:* Yesterday's "nonhuman EVA" of grappling & transferring the Shuttle-delivered ESP-3 (External Stowage Platform 3) for subsequent installation on the zenith side of the P3 truss element was another stellar achievement of the two Canadian robotarms SRMS (Shuttle Remote Manipulator System) and SSRMS (Space Station RMS). *[ESP-3 is an external pallet that can securely hold up to seven ORUs (Orbital Replacement Units). For Mission 13A.1, ESP-3 at deployment had the following massive ORUs (Orbital Replacement Units) mounted on it: CMG-3 (now successfully installed and running in the Z1 truss) on a PFRAM (Passive Flight Releasable Attachment Mechanism), a spare NTA (Nitrogen Tank Assembly), a spare SSRMS Pitch/Roll Joint, a spare BCDU (Battery Charge/Discharge Unit), the ATA FSE (Ammonia Tank Assembly/Flight Support Equipment), and two empty PFRAMs for future ORU storage.]*

*BOK Update:* After deactivating VD-SU control system mode of the BITS2-12 onboard telemetry measurement system, Fyodor and Oleg yesterday mated the final cable required to complete installation of the new BOK-3 Command Processing Unit of the TVM/Terminal & TsVM/Central computers in the RS. VD-SU was then successfully reactivated. The only remaining task is to remove the computer jumpers and mate the TVM & TsVM connections. No BOK-3 activation or testing is planned until after 13A.1 undock.

*26P Leak Checks:* In preparation for upcoming propellant transfers from Progress M-61/26P, TsUP/Moscow was scheduled to perform the standard leak checks on the 26P prop transfer equipment, e.g., the fuel (ZUG) and oxidizer (ZUO) lines.

*Something to Marvel at:* The stack's attitude control system (ISS CMGs or Shuttle Orbiter) is currently smoothly controlling a mass of ~732,000 lbs (332 tons).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:31am EDT [= epoch]):

Mean altitude -- 341.5 km

Apogee height -- 347.1 km

Perigee height -- 336.9 km

Period -- 91.37 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008265

Solar Beta Angle -- 18.9 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude gain in the last 24 hours -- 57

Revolutions since FGB/Zarya launch (Nov. 98) -- 50013

**Significant Events Ahead** (all dates Eastern and subject to change):

08/17/07 -- EVA-4 (~10:06am)

08/20/07 -- STS-118/Endeavour/13A.1 undocking (8:00am)

08/22/07 -- STS-118/Endeavour/13A.1 landing (12:48pm)

08/29/07 -- SSRMS setup for viewing PMA-3 relocation

08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

09/??/07 -- Progress M-60/25P undocking (SM aft port) [under review]

09/20/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/10/07 -- Soyuz TMA-11/15S launch (9:21am)

10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)

10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)

10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate

10/25/07 -- STS-120/Discovery/10A docking

11/03/07 -- STS-120/Discovery/10A undocking

11/5-8/07 -- Node 2 relocation; PMA2 relocation

11/13/07 -- US EVA-10

11/17/07 -- US EVA-11

12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- STS-122/Atlantis/1E docking

12/15/07 -- STS-122/Atlantis/1E undocking

12/22/07 -- Progress M-61/26P undocking (DC1) & reentry

12/23/07 -- Progress M-62/27P launch

12/25/07 -- Progress M-62/27P docking (DC1)

01/31/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

??/??/08 -- ATV-1 docking (SM aft port)

02/??/08 -- Russian EVA-20 [to be reviewed]

02/12/08 -- Progress M-63/28P launch [to be reviewed]

02/14/08 -- Progress M-63/28P docking

02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS

02/16/08 -- (NET) STS-123/Endeavour/1J/A docking

02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/14/07  
**Date:** Tuesday, August 14, 2007 7:14:46 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 08/14/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 7 for STS-118; Day 5 of Joint Ops.*

***Today at 11:17am EDT, the ISS, specifically its FGB "Zarya" module, completed 50,000 orbits of the Earth, having covered a distance of 2.1 billion kilometers (1.32 billion st.miles) in almost 3170 days. [The 19,300 kg (42,600 lbs) Zarya ("Dawn" was launched on a Russian/Khrunichev Proton from Baikonur almost nine years ago, on 11/20/1998, as the first element of the multi-national space station.]***

Wakeup time for the ISS crew shifted again for an earlier wakeup, to the left, at 6:07am EDT, with bedtime at 9:37pm (Shuttle crew: 10:07pm).

ESP-3 (External Stowage Platform 3) has been successfully installed on the P3 truss element. *[The activity began with FE-1 Kotov and FE-2 Anderson working with the SSRMS (Space Station Remote Manipulator System), completing its "walk-off" from the Lab to the MBS PDGF-3 (Mobile Service System/Power & Data Grapple Fixture-3), then maneuvering it to the ESP-3 (External Stowage Platform 3) pre-grapple position. "Piloted" by MS4 Barbara Morgan and MS1 Tracy Caldwell, the EPS-3 was then unberthed in the Shuttle cargo bay, lifted straight up to the hover position with the SRMS (Shuttle RMS) and handed over to the SSRMS for the subsequent maneuver to and installation at the zenith side of the P3 truss.]*

The newly installed CMG-3 (Control Moment Gyroscope 3) is working nominally.

In preparation for tomorrow's EVA-3, FE-2 Anderson, before breakfast, took the standard pre-EVA session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical*

*tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

As standard pre-EVA health status checkup, Clay Anderson also took the general U. S. PFE (Periodic Fitness Evaluation), assisted by Oleg Kotov, a 20-min procedure to check up on general crewmember health before/after the spacewalk.

*[Cardiovascular readings were logged on the MEC's IFEP software. Later, Clay also linked up with the ground via Ku- and S-band with NetMeeting/video for the usual private medical conference (PMC).]*

After the R&R (Removal & Replacement) of the Russian BOK-3 Command Processing Unit of the TVM/Terminal & TsVM/Central computers, Oleg Kotov had 2h 50m for gathering and prepacking the old BOK cable sections and connectors for return on the Shuttle

CDR Yurchikhin conducted the routine task of shooting two photos each of the docking cones of the passive docking assemblies (ASP-B) of the Service Module (SM) aft port and Docking Compartment (DC1), currently occupied by the Progress M-60/25P and M-61/26P spacecraft, a standard practice after Russian dockings. These images are used to refine current understanding of docking conditions. Fyodor afterwards downlinked the pictures via OCA assets. *[The objective is to take photo imagery of the scratch or scuff marks left by the head of the docking probe on the internal surface of the drogue (docking cone, ASP) ring, now rotated out of the passageway. Before shooting the picture, the cosmonaut highlights the scuffmark with a marker and writes the date next to it. As other crewmembers before him, the CDR used the Nikon D1X digital still camera to take two pictures with the hatch partially closed.]*

Yurchikhin conducted a search for three "missing" LKT TA251M1B Local Temperature Commutators (switches) with their associated PZU TA765B ROM (read-only memory) units, salvaged from previous Soyuz & Progress vehicles for returned on the Shuttle for recycling.

Kotov worked on auditing and relocating/consolidating accumulated accessories of the Russian AOK GANK-4M Real-Time Harmful Contaminant Gas Analyzer system, looking for stowage kits of the hardware and an Am-1 Ammonia Chip-Cassette.

After installing, on TsUP/Moscow Go, telemetry connectors of the Russian BVS computer system to the BITS2-12 onboard telemetry measurement system (to allow

ground monitoring), the CDR installed a cable for the BOK-3 unit behind an SM panel.

The FE-1 supported the ground in reactivating the Elektron oxygen generator at 32 amps, monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

After the Shuttle water dump maneuver (~12:51pm), PLT Hobaugh handed over attitude control authority of the stack from the Orbiter to ISS CMG-Only without RS MCS (Motion Control System) at ~3:50pm EDT. *[This was a test of the possibility of performing attitude control handovers from Orbiter to US CMG control if the RS thrusters were unavailable.]*

Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the periodic (~monthly) checkout/verification of IP-1 airflow sensors in the various RS (Russian segment) hatch openings (8) in the SM, FGB and DC1.

Working on the IMS (Inventory Management System), Fyodor later updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

At ~2:01pm EDT, STS-118 Mission Specialists Barbara Morgan and Tracy Caldwell (who celebrates her 38<sup>th</sup> birthday in space today) participated in PAO/TV interviews with ABC Good Morning America (Diane Sawyer), CBS News (Kelly Cobiella), CNN (Miles O'Brien), NBC (Tom Costello) and Fox (Jane Skinner).

At ~5:07pm, Barbara Morgan and Clay Anderson conducted a PAO EPO (Educational Payload Operation) event, taking photographs of crew members with the SEEDS payload.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1), RED resistive exerciser (CDR, FE-1, FE-2), and VELO cycle with bungee cord load trainer (FE-1).

Later tonight, Fyodor will copy the crew's exercise data file to the MEC (Medical

Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

For tomorrow's EVA-3 by Rick Mastracchio (EV1) and Clay Anderson (EV3), Oleg Kotov readied the DCS-760 cameras with their freshly charged batteries, while Clay removed Dave Williams' EV2 EMU from the Airlock (A/L) to replace it with his own EV3 suit, then configured the A/L EL (Equipment Lock) for the Campout, prepared the EVA tools, and completed the pre-EVA configuration of the OBSS OSE (Orbiter Boom Sensor System/Orbital Support Equipment) for its installation on the S1 truss.

After all preparations for EVA-3, including a review of the timeline & procedures, the two spacewalkers, Rick and Clay, will begin their "campout" in the "Quest" A/L, starting mask prebreathe at ~8:32pm, then closing hatches and initiating depressurization of the CL (Crewlock) from 14.7 to 10.2 psi. Sleep for the ISS crew will commence at 9:37pm, for the Shuttle crew at ~10:07pm.

Working off the discretionary job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

Also off the voluntary task list, Oleg performed the periodic status check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload in the Lada-10/ MIS (Module for the Investigation of Substrates) greenhouse.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 5:37am EDT [= epoch]):

Mean altitude -- 340.9 km

Apogee height -- 346.5 km

Perigee height -- 335.4 km

Period -- 91.35 min.

Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0008277  
Solar Beta Angle -- 23.9 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.76  
Mean altitude loss in the last 24 hours -- 70  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49996

**Significant Events Ahead** (all dates Eastern and subject to change):

08/15/07 -- EVA-3 (11:07am)  
08/17/07 -- EVA-4 (~10:06am)  
08/20/07 -- STS-118/Endeavour/13A.1 undocking (8:00am)  
08/22/07 -- STS-118/Endeavour/13A.1 landing (12:48pm)  
08/29/07 -- SSRMS setup for viewing PMA-3 relocation  
08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
09/??/07 -- Progress M-60/25P undocking (SM aft port) [under review]  
09/20/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate  
10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/5-8/07 -- Node 2 relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/17/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 [to be reviewed]  
02/12/08 -- Progress M-63/28P launch [to be reviewed]  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 08/13/07  
**Date:** Monday, August 13, 2007 11:17:49 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/13/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 6 for STS-118; Day 4 of Joint Ops. Underway: Week 17 of Increment 15.*

Wakeup time for the ISS crew shifted again, to the left, with wakeup at 6:37am EDT, bedtime at 9:37pm (Shuttle crew: 10:07pm).

Today's EVA-2 was completed successfully. Shuttle Mission Specialists Rick Mastracchio (EV1) and Dave Williams (EV2) –

- Removed the failed CMG-3 (Control Moment Gyroscope 3),
- Transferred the new CMG to ESP-2 (External Stowage Platform 2),
- Removed the new CMG from ESP-2
- Installed the new CMG on Z1 truss,
- Installed the failed CMG on ESP-2, and
- Cleaned Up.

*[Official start time of the spacewalk was 11:33am EDT (4 min ahead of schedule). It ended at 6:00pm. Total EVA duration (PET = Phase Elapsed Time) was 6h 27m. It was the 90<sup>th</sup> spacewalk for ISS assembly & maintenance and the 62<sup>nd</sup> from the station (28 from Shuttle, 38 from Quest, 22 from Pirs) totaling 370h 8m. After today's EVA, a total of 101 spacewalkers (71 NASA astronauts, 20 Russians, and ten astronauts representing Japan-1, Canada-4, France-1, Germany-1 and Sweden-3) have logged a total of 557h 32m outside the station on building, outfitting and servicing. It also was the 112<sup>th</sup> spacewalk by U.S. astronauts.]*

After the 8.5-hr sleep period before the spacewalk, the Crewlock (CL) hatch was cracked at ~7:27am EDT for a one-hour hygiene break/with mask prebreathe for Mastracchio and Williams, after spending the night on 10.2 psi campout. Around 8:27am, the hatch was closed again for a continued depress period at 10.2 psi.

During the EVA, PLT Hobaugh & FE-2 Anderson maneuvered the SSRMS in

support of the CMG-3 R&R (Removal & Replacement).

As part of EVA preps, CDR Yurchikhin verified powerdown of onboard ham radio equipment (Kenwood in SM & Ericsson in FGB) to prevent RF interference with the EMUs.

While the spacewalk went on, CDR Yurchikhin and FE-1 Kotov began the restoration of the Russian BVS onboard computer system to nominal operation, today performing the 3-hr job of routing & installing new 26P-delivered cabling in the Service Module (SM) for tomorrow's replacement of the Russian BOK-3 Command Processing Unit of the TVM/Terminal & TsVM/Central computers.

Yurchikhin transferred the OGS PWR (Oxygen Generation System Payload Water Reservoir) to the Shuttle for temporary stowage near the Shuttle galley. [The PWR will be vented and filled tomorrow.]

The CDR also had an additional 1.5 hrs reserved for equipment transfers from and to Endeavour. *[As of this morning, the crew was 21% ahead of the cargo transfer plan schedule.]*

During the spacewalk, Fyodor Yurchikhin installed newly arrived 18 blue U.S. RAM (Radiation Area Monitor) dosimeters in the ISS, documenting their deployment photographically, and collected 18 used white RAMs for return on 13A.1.

FE-1 Kotov collected potable water samples for chemical and microbial analysis from the SVO-ZV tap and the SRV-K warm tap, the latter after preliminary heating of the water (two heating cycles) and flushing. The samples will be returned on 13A.1. *[From each port, Oleg collected two 225 mL microbial samples for on-board processing and two 750 mL chemical archival (post-flight) samples for return to Earth, using Russian collection procedures. The flush water, collected in a water bag, is to be reclaimed for technical use.]*

Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables plus the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow, and today also the periodic (~monthly) checkout/verification of IP-1 airflow sensors in the various RS (Russian segment) hatch openings (8) in the SM, FGB and DC1.

The FE-1 also gathered data on total operating time & "On" durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

Working on the IMS (Inventory Management System), Oleg later updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Time again for recharging the new Motorola-9505 Iridium satellite phone brought up on Soyuz 14S, a monthly routine job. Yurchikhin took care of the recharge, completing the process and cleaning up at about 3:50pm EDT. *[After retrieving it from its location in the Soyuz TMA-10/14S descent module (BO), Fyodor initiated the recharging of its lithium-ion battery, monitoring the process every 10-15 minutes as it took place. Upon completion, the phone was returned inside its SSSP Iridium kit and stowed it back in the BO's operational data files (ODF) container. The satphone accompanies returning ISS crews on Soyuz reentry & landing for contingency communications with SAR (Search-and-Rescue) personnel after touchdown. The Russian-developed procedure for the monthly recharging has been approved jointly by safety officials. During the procedure, the phone is left in its fire-protective fluoroplastic bag with open flap.]*

Kotov performed the periodic inspection of spaces behind panels in the SM (#206-220) and DC1 (#301).

The FE-1 transferred ("walked off") the SSRMS to PDGF-2 (Power & Data Grapple Fixture 2) on the MBS (Mobile Base System).

After A/L CL (Airlock Crewlock) repress and return of the spacewalkers, Clay Anderson completed the usual post-EVA activities in the Airlock (A/L), including downlinking the digital EVA photo/video imagery, while Oleg Kotov started the EMU battery recharge.

Oleg Kotov also set up the equipment for tomorrow's planned "Urolux" biochemical urine test (PZE MO-9), standard operating procedure before & after each Orlan EVA.

Yesterday, CDR Yurchikhin and FE-1 Kotov removed the failed BOK-3 Command Processing Unit of the TVM/Terminal & TsVM/Central computers and installed a new unit. The remainder of the operations are planned for tomorrow.

On Endeavour, the FI (Focused Inspection) yesterday identified TPS damage at one site 3 in. by 2 in. spanning two tiles. Additional inspection will be performed on a .2 in. by 1 in. cavity. There are several options available for repair if found necessary. The MMT (Mission Management Team) has determined that the Orbiter is safe to reenter in the current condition in case of an emergency.

*Nitrogen Transfer:* As of this morning, N<sub>2</sub> transfer is approximately 35 lbs out of a planned transfer of 50 lbs.

ISS crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1) and VELO bike with bungee cord load trainer (CDR, FE-1). *[No exercise allowed on ISS or Shuttle during OBSS operations on SSRMS.]*

Later, Fyodor copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off the discretionary job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this noon, 12:44pm EDT [= epoch]):  
Mean altitude -- 341.0 km  
Apogee height -- 346.5 km  
Perigee height -- 335.5 km  
Period -- 91.35 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.000822  
Solar Beta Angle -- 28.9 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.76  
Mean altitude loss in the last 24 hours -- 70  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49985

**Noteworthy Milestone ahead:** Tomorrow, ISS completes its 50,000<sup>th</sup> orbit.

tomorrow.

**Significant Events Ahead** (all dates Eastern and subject to change):

08/15/07 -- EVA-3 (11:07am)  
08/17/07 -- EVA-4 (~10:06am)  
08/20/07 -- STS-118/Endeavour/13A.1 undocking (8:00am)  
08/22/07 -- STS-118/Endeavour/13A.1 landing (12:48pm)  
08/29/07 -- SSRMS setup for viewing PMA-3 relocation  
08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
09/??/07 -- Progress M-60/25P undocking (SM aft port) [under review]  
09/20/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate  
10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/5-8/07 -- Node 2 relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/17/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 [to be reviewed]  
02/12/08 -- Progress M-63/28P launch [to be reviewed]  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking

05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 08/12/07  
**Date:** Monday, August 13, 2007 12:17:36 AM  
**Attachments:**

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### **ISS On-Orbit Status 08/12/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- Flight Day 5 for STS-118; Day 3 of Joint Ops. Ahead: Week 17 of Increment 15.*

*13A.1 Mission Extension:* As a result of successful SSPTS (Station-to-Shuttle Power Transfer System) operations, the MMT (Mission Management Team) made the decision to extend the Shuttle mission by three days to a 14+2 mission and add a fourth EVA.

Wakeup time for the ISS crew remains at the shifted "docked" schedule of wakeup at 7:07am EDT, bedtime at 10:07pm (Shuttle crew: 10:37pm).

Yesterday, the crew completed all scheduled activities, plus many get-aheads. During the successful first spacewalk, EVA-1, Shuttle Mission Specialists Rick Mastracchio (EV1) and Dave Williams (EV2) –

- installed the S5 truss element,
- relocated the PVRGF (Photovoltaic Radiator Grapple Fixture) from the S5 launch position to the S5 keel,
- connected utility umbilicals between S4 and S5,
- removed four outboard launch locks on S5 to allow future installation of S6,
- retracted and cinched the P6 PVR,
- cycled the S5 CLA (Capture Latch Assembly),
- retrieved a 3/8 " Drive Ratchet Wrench from the Z1 Tool Box,
- inspected four suspect P6 PiP Pins (all found to be intact), and
- relocated an APFR (Articulating Portable Foot Restraint) from WIF-9 to WIF-11.

A total of 24 lbs of nitrogen (N2) was transferred from the Shuttle to the ISS Hi-P storage tanks (outside the Airlock).

Today, CDR Yurchikhin and FE-1 Kotov continued the routing and installation of cabling for the BOK-3 Command Processing Unit of the TVM/Terminal & TsVM/ Central computers and began the actual removal & replacement of the failed BOK-3 with the new 26P-delivered unit. *[BOK-3 R&R is ahead of schedule, but the Russian segment (RS) needs telemetry communications to proceed with checkout activities. Upon removal of the old BOK-3 unit, the crew reported to TsUP/Moscow that there was cold condensate behind it. Drops of humidity and mold were discovered. The unit itself is humid. Pictures will be downlinked for review. The crew recommended some sort of heat shield barrier be fashioned before installation of the new unit is installed. TsUP gave crew a Go to find something on ISS to use as a barrier and to photograph it.]*

FE-2 Anderson meanwhile set up, connected and activated the new CGBA-5 (Commercial Generic Bioprocessing Apparatus 5) payload hardware for operation.

A major portion of the crew timeline (~3 hrs) was set aside for the Focused Inspection (FI) of some selected damage locations on the Endeavour's bottom heat shield, identified during the RPM inspection. *[For the FI, the SSRMS (Space Station Remote Manipulator System) grappled the OBSS (Orbiter Boom Sensor System) and moved it from the handoff position to under the belly with a series of single joint maneuvers. The forward targets were scanned first, and the arm then moved with an OCAS (Operator Commanded Auto Sequence) to the aft target. Later in the day, the SSRMS was maneuvered to the pre-grapple position and then handed off, after which Clay Anderson moved the SSRMS to the Lab rear by grappling the Lab PDGF (Power & Data Grapple Fixture) in preparation for EVA-2 activities.]*

After MS5 Alvin Drew's data acquisition session with the Canadian Space Agency's PMDIS (Perceptual Motor Deficits in Space) hand-to-hand coordination experiment yesterday, FE-2 Anderson set up the video/camcorder equipment for recording a PMDIS session with MS3 Dave Williams (CSA). After the shoot, the camcorder was deactivated and the PMDIS gear stowed. *[PMDIS investigates why Shuttle astronauts experience difficulty with hand-eye coordination while on orbit. PMDIS will attempt to distinguish between the three current theories for this initial decline in hand-eye coordination in space {the current explanations are as follows: The brain isn't adapting to the weightlessness of space; the difficulty of performing fine movements when floating in space; and stress due to factors such as space sickness and sleep deprivation}. PMDIS first measures the Shuttle astronaut's hand-eye coordination prior to docking with ISS (transition from 1-g to zero-g). Measurements are taken while the astronaut's arm is securely supported or floating free in three conditions: Tapping targets on a computer screen with a stylus and moving a cursor between the targets with a joystick, performing these*

*tasks while responding to tones presented via earphones with a button press. The experiment will test the theory that the loss of eye-hand coordination during spaceflight is due to the disruption of certain neural circuits in the human brain, arising from a disruption in the vestibular system.]*

Clay Anderson worked on the right glove of his EMU (Extravehicular Mobility Unit), worn over a comfort glove, to make it more comfortable in the thumb area during EVA activities, following uplinked repair instructions.

Oleg Kotov had another data monitoring & calldown session with the MATRYOSKA-R radiation payload and its Lulin-5 electronics box.

Fyodor Yurchikhin performed IFM (In-flight Maintenance) on the TVIS (Treadmill with Vibration Isolation System) by removing and replacing its skirt with a new one delivered on Endeavour. The installation was then checked for full treadmill motion by raising and lowering the TVIS and moving it side to side with the Service Module (SM) "pit". *[The old skirt was stowed for return on 13A.1.]*

Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), Yurchikhin updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

After lunch, Clay Anderson filled out the regular FFQ (Food Frequency Questionnaire), his seventh, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Anderson prepared the DCS-760 cameras for tomorrow's spacewalk.

Clay also assisted MS5 Drew in transferring the EPO (Educational Payload Operation) hardware to the ISS for the educational activities by MS4 Barbara Morgan.

Getting ready for tomorrow's EVA-2, the two designated spacewalkers, Rick Mastracchio (EV1) & Dave Williams (EV2), along with Yurchikhin and Kotov, reviewed procedures and timeline for the excursion.

Afterwards, the “Campout” by Mastracchio & Williams in the A/L Crewlock (CL) began with mask prebreathe and tool configuration at ~9:00pm, with hatches closed and depressurization of the CL initiated from 14.7 to 10.2 psi for their 8.5-hr sleep time.

The planned timeline for EVA-2 tomorrow will be -

- Campout EVA Prep (8:27am EDT)
- Transfer Ops (9:37am)
- Egress EVA #2 (11:37am)
- CMG R&R (11:37am)
  - Remove failed CMG
  - Transfer new CMG to ESP-2
  - Remove new CMG from ESP-2
  - Install new CMG on Z1
  - Install failed CMG on ESP-2
  - Clean Up
- Ingress EVA #2 (5:42pm)
- SSMRS Walkoff Lab to MBS (6:22pm)

ISS crewmembers completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR) and RED resistive exercise device (FE-1). *[No exercise allowed on ISS or Shuttle during OBSS operations non SSRMS.]*

Later, Fyodor copied the crew’s exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~8:50pm, Clay had his weekly PFC (Private Family Conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop).

Working off the discretionary job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

**Weekly Science Update** (*Expedition Fifteen -- 16<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* On 8/7, a 5-min test was done with recording on card 933, the result was a file of around ~60kB, which is the normal size expected. Thus it is assumed that the facility is performing nominally. Data are being downlinked, but not yet received. Next ALTCRISS activity is currently scheduled for 8/27.

*ANITA:* Planned.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2:* Next session scheduled around 9/10.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS):*  
Continuing,

*CFE (Capillary Flow Experiment):* Reserve.

*CHROMOSOME-2 (E14 SFP):* Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* Powered off. Waiting to support other experiments such as BCAT.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* Powered off. Contains CSI-01, awaiting return home on 13A.1.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Next scheduled operation is 10/29-11/3.

*EMCH (Elastic Memory Composite Hinge):* Complete.

*EPO (Educational Payload Operation) Kit C:* Planned.

*IMMUNO (Saliva Sampling):* First session completed successfully on 7/27. Next session to be planned at the end of the Increment.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):*  
Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1*: Samples uploaded on 13A.1 and ready for transfer to ISS. Start of MULTIGEN experiment is currently scheduled in Week 18.

*MUSCLE (E14 SFP)*: Completed.

*MSG-SAME (Microgravity Science Glovebox)*: Planned.

*NEOCYTOLYSIS (E14 SFP)*: Completed.

*NOA-2 (Nitric Oxide Analyzer)*: Planned.

*NUTRITION*: “Clay, great work on Wednesday. And thanks a bunch for reporting down all the tube numbers and bar codes.”

*SAMPLE*: Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems)*: SAMS and MAMS were activated on 8/8 and are collecting acceleration data in support of joint ops. The SAMS ICU locked up late on 8/8, but was recovered on 8/9 after a laptop reboot by the crew.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight)*: Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite)*: Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft)*: Seven of the eight required SWAB sampling runs have now been completed. The next, and last, SWAB Air and Surface activities are scheduled to be done prior to the docking of 15S. Thanks to the crew for the information about the blocked sampling locations called out in the procedure. The SWAB team will work to correct this issue before the crew’s next SWAB session. “Thanks also for your suggestion regarding cue cards, which we are also working to implement before the next session.”

*TRAC (Test of Reaction & Adaptation Capabilities)*: Planned.

*CEO (Crew Earth Observations)*: Through 8/5 the ground has received a total of 9,625 CEO images for review and cataloging for Increment 15. “We are pleased to report your successful acquisition of the Polar Mesospheric Cloud phenomenon over the North Pacific Ocean that we requested on 8/1. We are also glad that you

tried different lens setting and techniques in your session. This offered a number of opportunities to enhance different cloud features. We look forward to more of these types of sessions in the coming weeks while the opportunity lasts. You also acquired imagery of our Kerguelen Islands target on 8/3. It appears the area of interest to the west was under clouds; however your photos of the eastern end of the archipelago are very good and provide rare views of large beds of kelp in the near-shore waters. Keep up the good work!

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:39am EDT [= epoch]*):

Mean altitude -- 341.1 km

Apogee height -- 346.7 km

Perigee height -- 335.6 km

Period -- 91.36 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008267

Solar Beta Angle -- 38.8 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 70

Revolutions since FGB/Zarya launch (Nov. 98) -- 49950

**Noteworthy Milestone ahead:** ISS will complete its 50,000<sup>th</sup> orbit of the Earth next Tuesday.

**Significant Events Ahead** (*all dates Eastern and subject to change*):

08/13/07 -- EVA-2 (11:37am)

08/15/07 -- EVA-3 (11:07am)

08/17/07 -- STS-118/Endeavour/13A.1 undocking (8:28am) -- *if not extended to 14 days*

08/19/07 -- STS-118/Endeavour/13A.1 landing (1:16pm)-- *if not extended to 14 days*

08/17/07 -- EVA-4 (~10:06am) -- *if extended to 14 days*

08/20/07 -- STS-118/Endeavour/13A.1 undocking (8:00am) -- *if extended to 14 days*

08/22/07 -- STS-118/Endeavour/13A.1 landing (12:48pm) -- *if extended to 14 days*

08/29/07 -- SSRMS setup for viewing PMA-3 relocation  
08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
09/??/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/20/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate  
10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/5-8/07 -- Node 2 relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/17/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 08/11/07  
**Date:** Saturday, August 11, 2007 10:53:03 PM  
**Attachments:** [image001.gif](#)  
[image002.gif](#)

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### **ISS On-Orbit Status 08/11/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 4 for STS-118; Day 2 of Joint Ops.*

**S5 truss installation on the S3/S4 truss was nominal, with no issues.** All EVA-1 objectives plus get-ahead tasks were accomplished.

Yesterday, grappling of the starboard-5 spacer truss segment by the SRMS (Shuttle Remote Manipulator System), transfer of the S5 truss out of the Endeavour payload bay to the ISS and its "handover" to the SSRMS (Space Station Remote Manipulator System) went smoothly and on time. The S5 was "parked" overnight at the SSRMS end effector for establishing temperature equilibrium prior to its installation today.

SSPTS (Station-to-Shuttle Power Transfer System) activation was also completed yesterday with three of four OPCUs (Orbiter Power Converter Units) checked out successfully per the plan. *[For the first time in history, the ISS is transferring power to the Orbiter to allow it to remain docked longer. OPCUs 1A, 1B, & 2A are currently active, transmitting up to 6.45 kW of power to the Shuttle PTUs (Power Transfer Units). Two of the OPCUs were deactivated this morning, prior to locking the S4 BGA (Beta Gimbal Assembly) for EVA-1, to maintain ISS power balance.]*

Today's EVA-1 was completed successfully. Shuttle Mission Specialists Rick Mastracchio (EV1) and Dave Williams (EV2) –

- installed the S5 truss element,
- relocated the PVR (Photovoltaic Radiator) Grapple Fixture from the S5 launch position to the S5 keel,
- connected utilities between S4 and S5,
- removed launch locks on S5 to allow future installation of S6, and
- retracted and cinched the P6 PVR.

*[Official start time of the spacewalk was 12:28p EDT (5 min behind schedule). It ended at 6:45pm. Total EVA duration (PET = Phase Elapsed Time) was 6h 17m. It was the 89<sup>th</sup> spacewalk for ISS assembly & maintenance and the 61<sup>st</sup> from the station (28 from Shuttle, 38 from Quest, 22 from Pirs) totaling 363h 41m. After today's EVA, a total of 99 spacewalkers (70 NASA astronauts, 20 Russians, and nine astronauts representing Japan-1, Canada-3, France-1, Germany-1 and Sweden-3) have logged a total of 551h 5m outside the station on building, outfitting and servicing. It also was the 111<sup>th</sup> spacewalk by U.S. astronauts.]*

After the 8.5-hr sleep period before the spacewalk, the Crewlock (CL) hatch was cracked at ~8:17am EDT for a one-hour hygiene break/with mask prebreathe for Mastracchio and Williams, after spending the night on 10.2 psi campout. Around 9:17am, the hatch was closed again for a continued depress period at 10.2 psi.

Prior to EV1/EV2 egress from the CL, Hobaugh & Anderson maneuvered the SSRMS with the S5 truss element to the ready-to-latch position at the S4 truss and completed capture of the S5 by the S4 SSAS (Segment-to-Segment Attachment System) and bolting, with the SSRMS switched to "limp" mode.

As part of EVA preps, the FE-1 verified powerdown of onboard ham radio equipment (Kenwood in SM & Ericsson in FGB) to prevent RF interference with the EMUs.

While the spacewalk went on, CDR Yurchikhin and FE-1 Kotov began the restoration of the Russian BVS onboard computer system to nominal operation, today performing the 3-hr job of routing & installing new 26P-delivered cabling in the Service Module (SM) for tomorrow's replacement of the Russian BOK-3 Command Processing Unit of the TVM/Terminal & TsVM/Central computers.

Yurchikhin also started the transfer of nitrogen (N<sub>2</sub>) gas from the Shuttle to the ISS hi-P storage tankage.

Clay Anderson set up the Canadian Space Agency's PMDIS (Perceptual Motor Deficits in Space) hand-to-hand coordination experiment, readying it for the data acquisition session conducted later by MS5 Alvin Drew. A second session, by Dave Williams, is scheduled for tomorrow. Results will then be copied to CD and the equipment stowed for the next run. *[PMDIS investigates why Shuttle astronauts experience difficulty with hand-eye coordination while on orbit. PMDIS will attempt to distinguish between the three current theories for this initial decline in hand-eye coordination in space {the current explanations are as follows: The brain isn't adapting to the weightlessness of space; the difficulty of performing fine movements when floating in space; and stress due to factors such as space sickness and sleep*

*deprivation}. PMDIS first measures the Shuttle astronaut's hand-eye coordination prior to docking with ISS (transition from 1-g to zero-g). Measurements are taken while the astronaut's arm is securely supported or floating free in three conditions: Tapping targets on a computer screen with a stylus and moving a cursor between the targets with a joystick, performing these tasks while responding to tones presented via earphones with a button press. The experiment will test the theory that the loss of eye-hand coordination during spaceflight is due to the disruption of certain neural circuits in the human brain, arising from a disruption in the vestibular system.]*

Oleg Kotov performed the periodic data collection and downlinking on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse.

FE-2 Anderson completed the usual post-EVA activities in the Airlock (A/L).

Clay also downlinked the digital photography obtained during the spacewalk, while Oleg Kotov assisted Mastracchio and Williams in refilling the EMU (Extravehicular Mobility Unit) water tanks and initiating the recharge of the depleted EVA batteries in the BSA (Battery Stowage Assembly).

The FE-1 performed the regular monthly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), inspecting the condition of harnesses, belt slats, corner bracket ropes, IRBAs (Isolation Restorative Bungee Assemblies) and gyroscope wire ropes for any damage or defects, lubricating as required plus recording time & date values.

Oleg also deployed the newly updated SODF (Station Operation Data File) Warning Books.

The CDR conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), Fyodor updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The ISS crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1), RED resistive exercise device (CDR), and VELO bike with bungee cord load trainer (FE-1). *[No exercise allowed on ISS or Shuttle during S5 grappled by both arms.]*

Later, Fyodor copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off the discretionary job list, the FE-1 conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

*RPM Update:* The R-bar Pitch Maneuver photo/video imagery went as per plan. Evaluation of downlinked pictures showed one area between the right ET door and the right landing gear doors of Endeavour which appears to be coincident with another imaging of a small spray resembling an ice impact 58 seconds after launch midway. The Focused Inspection scheduled for tomorrow (FD5) will provide a three-dimensional map of the damage or cavity at this location. The results and the condition of the TPS at the site of the apparent ice impact will be known Monday afternoon (see two images, below).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:39am EDT [= epoch]):

Mean altitude -- 341.1 km

Apogee height -- 346.7 km

Perigee height -- 335.6 km

Period -- 91.36 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008267

Solar Beta Angle -- 38.8 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 70

Revolutions since FGB/Zarya launch (Nov. 98) -- 49950

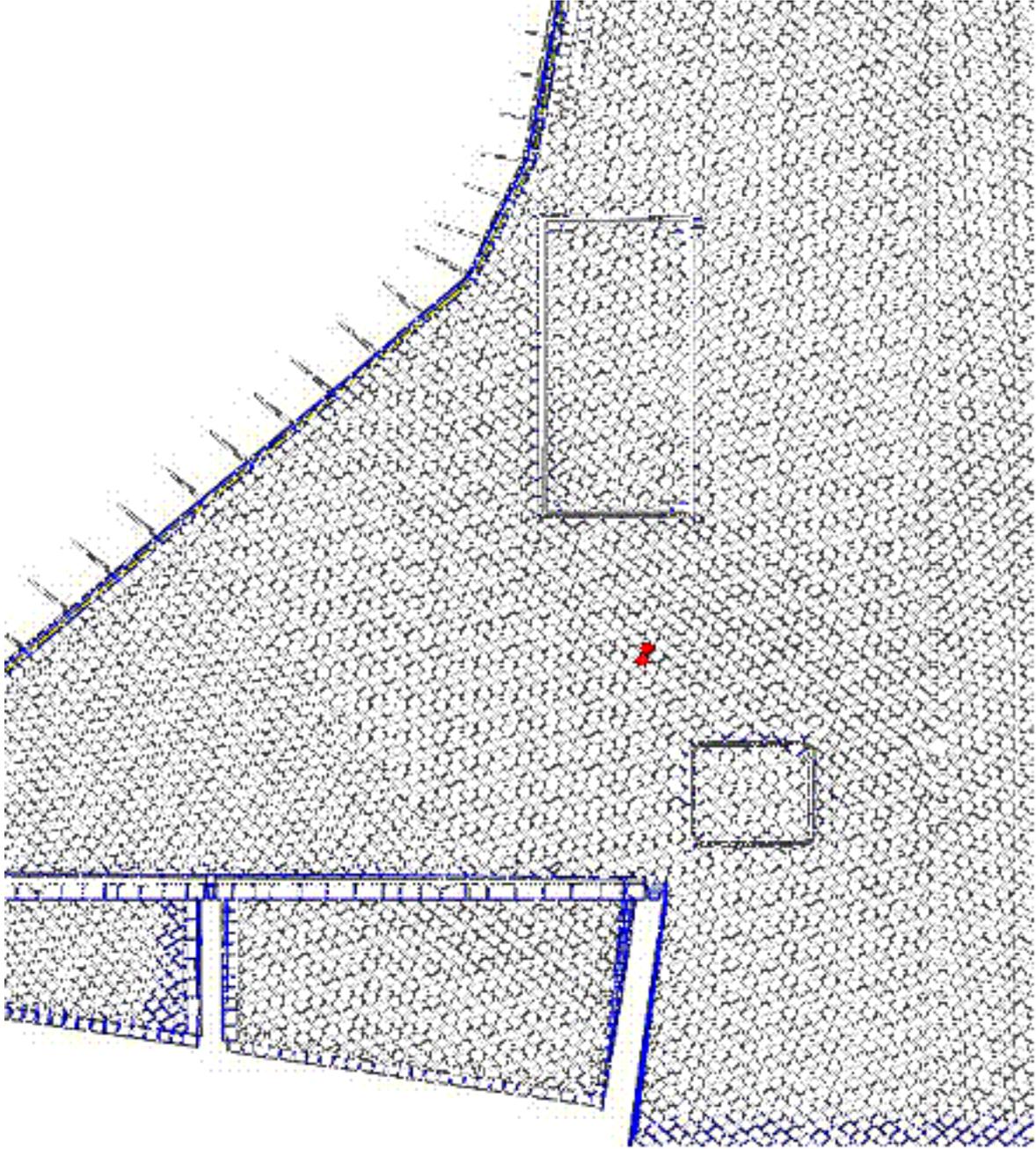
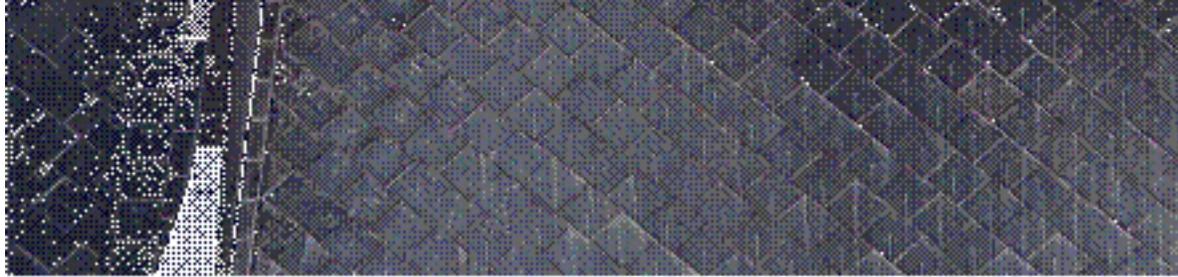
**Significant Events Ahead** *(all dates Eastern and subject to change):*

08/13/07 -- EVA-2 (11:36am)  
08/15/07 -- EVA-3 (11:06am)  
08/17/07 -- STS-118/Endeavour/13A.1 undocking (8:28am) -- *if not extended to 14 days*  
08/19/07 -- STS-118/Endeavour/13A.1 landing (1:16pm)-- *if not extended to 14 days*  
08/17/07 -- EVA-4 (~10:06am) -- *if extended to 14 days*  
08/20/07 -- STS-118/Endeavour/13A.1 undocking (8:00am) -- *if extended to 14 days*  
08/22/07 -- STS-118/Endeavour/13A.1 landing (12:48pm) -- *if extended to 14 days*  
08/29/07 -- SSRMS setup for viewing PMA-3 relocation  
08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
09/??/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/20/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate  
10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/5-8/07 -- Node 2 relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/17/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)

- 04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)
- 04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)
- 04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.
- 04/26/08 -- (NET) STS-124/Discovery/1J docking
- 05/02/08 -- (NET) STS-124/Discovery/1J undocking.

***Possible debris damage between right ET door & right landing gear doors  
(see also below).***





**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 07/23/07  
**Date:** Saturday, August 11, 2007 12:07:28 PM  
**Attachments:**

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### **ISS On-Orbit Status 07/23/07**

All ISS systems continue to function nominally, except those noted previously or below. *EVA Day. Wake-up was shifted 30 min earlier, to 1:30am EDT. Sleep will be equally earlier, at 4:30pm.*

FE-2 Anderson continued his current SLEEP experiment by accessing the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

Clay Anderson (EV1) and Fyodor Yurchikhin (EV2) **successfully completed EVA-9** with A/L (Airlock) hatch closure at 2:05pm EDT, followed by cleanup and post-EVA ops.

Accomplished tasks of this spacewalk were –

- Install a video stanchion at CP-7 (Camera Position 7) on the S0/P1 truss interface, from the VSSA (Video Stanchion Support Assembly);
- Reconfigure power connections at the SASA (S-band Antenna Support Assembly) on the S1 truss;
- Remove & replace the failed RPCM (Remote Power Controller Module) S04B\_F on the S0 truss which has impacted MT (Mobile Transporter) operations, and return old RPCM to A/L (Airlock);
- Install an APFR (Articulated Portable Foot Restraint) on the SSRMS (Space Station Remote Manipulator System);
- EV1 ingress APFR, maneuver to jettison position & jettison the integrated VSSA FSE (Flight Support Equipment) and EFRAM (EVA Flight-Releasable Attachment Mechanism), with a combined mass of ~212 lb, in retrograde direction [done at ~9:19am];
- Jettison the ~1400 lb Early Ammonia Servicer (EAS) [done at ~10:36am];

- Perform CBM (Common Berthing Mechanism) seal cleaning at Node nadir port (for PMA-3 relocation in late August); and
- Clean up, returning APFR to ESP-2 (External Stowage Platform 2) and ingress A/L.

As Get-ahead Tasks, the crewmembers also removed GPS antenna #4, relocated an auxiliary bag from P6 to Z1, and released two fluid tray bolts on the Node Unity. *[Official start time of the spacewalk was 6:24am EDT, 6 minutes ahead of schedule. Total EVA duration (PET = Phase Elapsed Time) was 7 hrs 41 min. It was the 88<sup>th</sup> spacewalk for ISS assembly & maintenance and the 60<sup>th</sup> from the station (28 from Shuttle, 38 from Quest, 22 from Pirs) totaling 357h 24m. After today's EVA, a total of 97 spacewalkers (69 NASA astronauts, 20 Russians, and eight astronauts representing Japan-1, Canada-2, France-1, Germany-1 and Sweden-3) have logged a total of 544h 48m outside the station on building, outfitting and servicing. It also was the 110<sup>th</sup> spacewalk by U.S. astronauts.]*

Before spacewalk begin, the Crewlock (CL) hatch was cracked for a hygiene break/ with mask prebreathe for Yurchikhin and Anderson, after spending the night on 10.2 psi campout. Around 3:00am, the hatch was closed again for a continued depress period at 10.2 psi.

FE-1 Kotov, who provided IVA (intravehicular activities) support, used a DCS 760 EVA camera for documenting the hatch closure and ensured Lab science window shutter closure.

Oleg also set up the final configuration of the STTS onboard audio subsystem to support the EVA.

After the spacewalk, the FE-1 reset the STTS comm system was reset to the original conditions and reconfigured the DCS 760 EVA cameras.

In addition, Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Later tonight (4:20pm EDT), ISS attitude control authority will be handed over to Russian MCS (Motion Control System) thrusters for maneuvering to reboost attitude at 4:25pm. After the reboost firing, the station, at ~6:45pm, will maneuver to +XVV TEA (+X-Axis in Velocity Vector/Torque Equilibrium Attitude) and control authority will return to US Momentum Management at ~7:30pm.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this 7:29am EDT [= epoch]*):

Mean altitude -- 334.1 km  
Apogee height -- 341.8 km  
Perigee height -- 326.5 km  
Period -- 91.21 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0011421  
Solar Beta Angle -- 31.7 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in the last 24 hours -- 75 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49650

**Significant Events Ahead** (*all dates Eastern and subject to change*):

08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry  
08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 “Harmony”, racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12

12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/10/07  
**Date:** Friday, August 10, 2007 8:06:06 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/10/07**

All ISS systems continue to function nominally, except those noted previously or below..

**STS-118/Endeavour docked smoothly** at the PMA-2 (Pressurized Mating Adapter-2) port at 2:02pm EDT (9 min behind schedule), and the station now hosts ten occupants again as Mission 13A.1 is underway. *[All docking hooks were closed at 2:22pm, and the station was reoriented as planned to minimize the risk of micrometeoroid/debris impacts upon the Shuttle (-x-axis in velocity vector, +z-axis in local vertical). Hatches were open at 4:04pm, and the new crew was welcomed aboard the ISS and given the mandatory safety briefing. Later, the S5 truss was successfully unberthed in the Shuttle PLB (Payload Bay) with the SRMS (Shuttle Remote Manipulator System), handed off to the ISS SSRMS (Space Station RMS) and "parked" overnight for tomorrow's installation.]*

Wakeup time for the ISS crew had shifted once more this morning, to 7:37am EDT, for a long day (sleep time tonight: 11:07pm).

Preparatory to the Shuttle arrival, FE-2 Anderson closed the Lab science window shutter as protection against thruster plumes, connected the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cables at the Lab & Cupola RWS (Robotics Work Stations) for the SSRMS (Space Station Remote Manipulator System) video coverage, and installed the IWIS (Internal Wireless Instrumentation System) configured the IWIS (Internal Wireless Instrumentation System) hardware for measuring and recording structural dynamics. IWIS will be dismantled again tonight.

FE-1 Kotov assembled the STIMUL-01 hardware and performed another 40-min. functional test of the physical fitness experiment, using the Russian PZE STIMUL-01 suit for physical stimulation/conditioning training with the freshly charged

batteries. *[The STIMUL-01 neuromuscular myostimulator suit uses electrical stimulation for rhythmic contraction and relaxation of body muscle fibers for conditioning. It is part of the suite of BMS (Biomedical Support) systems under development at IBMP (Institute for Biomedical Problems) in Moscow for long-duration spaceflights including piloted Mars missions.]*

Yurchikhin collected the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

For the Endeavour docking, the CDR worked with the ground to shut down the Elektron O<sub>2</sub> generator. Later in the evening, the Elektron was reactivated at 32 amps, with the FE-1 monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Yurchikhin and Kotov conducted a final checkout of the photo/video equipment for the RPM (Rbar Pitch Maneuver) before Endeavour docking. They also verified the readiness of the communications configuration required for the photo shoot.

Shortly before the docking, Kotov configured the Russian MCS (Motion Control System) for the automatic "PMA-2 Arrival" mode, an operational sequence used to monitor Orbiter arrival at the PMA-2. *[At "Capture Confirmed" (2:02pm), ISS attitude was immediately set to "free drift" to allow dampening out relative motions of ISS and Endeavour (with the ODS dampers/shock absorbers), then maneuvered to "Mated TEA" (Torque Equilibrium Attitude) to account for the new overall configuration with Endeavour docked. Later tonight it will maneuver to "Overnight Park" attitude when the S5 truss element is attached to the SSRMS and "parked".]*

Oleg Kotov also performed final STTS communications configuration checks for the docking, while Clay Anderson prepared for taking photo/video footage of the approach and docking.

Prior to final approach, Scott Kelly & Charles Hobaugh took the Endeavour through the scheduled RPM at ~600 ft distance under the ISS, a full-circle backflip to allow digital imagery of its TPS (thermal protection system) from the ISS by Yurchikhin & Kotov, with photography commencing at 12:56pm and ending at 1:05pm. *[The ISS*

*crew had about 100 seconds actual shooting time to photograph the Orbiter TPS. Fyodor operated the 400mm-lens DCS (digital camera system) and Oleg wielded the long-barreled 800mm camera, each one attempting to obtain about 150 pictures. After the docking, the images will be downlinked for further analysis.]*

After the RPM, at a distance of ~575 ft, Endeavour initiated TORVA (Twice Orbital Rate V-bar Approach). The final Go for Docking was given, and Endeavour closed in a slow rate for docking at 2:02pm.

After leak checks of the ODS (Orbiter Docking System) vestibule for about an hour, hatches were opened at ~4:04pm and hand shakes between the crews came 15 minutes later.

Before and during ISS/STS hatch opening, Oleg Kotov performed the standard collection of air samples with the Russian AK-1M sampler in the SM, FGB, and Lab,

Joint crew activities after the Welcome ceremony included –

- Safety briefing for all,
- Preparing the Orbiter approach imagery for downlink,
- Setting up the transfer equipment for supplying Shuttle O<sub>2</sub> (oxygen) to the ISS to support the “Campout” by Mastracchio and Williams overnight in the Airlock (A/L) for denitrogenation/pre-breathe,
- Transferring the Shuttle EMU/spacesuits to the ISS,
- Installing the REBAs (Rechargeable EVA Battery Assemblies) in the EMUs, and
- Checking out the REBA powered suit equipment and tools.

Also after the docking, Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables, and today also the periodic (~monthly) checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

Working on the IMS (Inventory Management System), the CDR updated/edited its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

After completing A/L Equipment Lock (EL) configuration for the first spacewalk tomorrow and conducting a joint review of EVA-1 timeline & procedures at ~7:20pm, the two spacewalkers, Rick Mastracchio (EV1) and Dave Williams (EV2), will begin their “campout” in the “Quest” A/L, starting mask prebreathe at ~10:00pm, then closing hatches and initiating depressurization of the CL (Crewlock) from 14.7 to

10.2 psi. Sleep for the ISS crew will commence at 11:07pm, for the Shuttle crew at ~11:37pm.

Earlier today, the ISS crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR), RED resistive exercise device (FE-1, FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).  
[No exercise allowed on ISS or Shuttle during S5 grappled by both arms.]

Later, Oleg copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (*all dates Eastern and subject to change*):

08/11/07 -- EVA-1 (12:36pm)  
08/13/07 -- EVA-2 (11:36am)  
08/15/07 -- EVA-3 (11:06am)  
08/17/07 -- STS-118/Endeavour/13A.1 undocking (8:28am) -- *if not extended to 14 days*  
08/19/07 -- STS-118/Endeavour/13A.1 landing (1:16pm)-- *if not extended to 14 days*  
08/17/07 -- EVA-4 (~10:06am) -- *if extended to 14 days*  
08/20/07 -- STS-118/Endeavour/13A.1 undocking (8:00am) -- *if extended to 14 days*  
08/22/07 -- STS-118/Endeavour/13A.1 landing (12:48pm) -- *if extended to 14 days*  
08/29/07 -- SSRMS setup for viewing PMA-3 relocation  
08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
09/??/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/20/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate

10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/5-8/07 -- Node 2 relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/17/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/09/07  
**Date:** Thursday, August 09, 2007 2:53:59 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 08/09/07**

All ISS systems continue to function nominally, except those noted previously or below. *STS-118/13A.1 FD 2. ISS crew off duty.*

ISS sleep/work cycle shifted to the right by another two hours: Wakeup - 7:03am EDT, sleep - 10:33pm (tomorrow/FD3: wakeup -- 7:33am; sleep -- 11:06pm).

**STS-118/Endeavour lifted off last night from KSC Pad 39A on time at 6:36pm EDT** flawlessly on Mission ISS-13A.1 and is currently catching up with the ISS, carrying the seven-member crew of Commander Scott Kelly, Pilot Charles Hobaugh and Mission Specialists Tracy Caldwell, Rick Mastracchio, Dave Williams (CSA), Barbara Morgan, and Alvin Drew. **We are off to another great mission!**  
*[Docking is scheduled for tomorrow (Friday, 8/10) at about 1:53pm EDT. With the docking, ISS Stage 13A.1 begins. After hatch opening (~3:08pm), first tasks are safety briefing, S5 truss hand-off from SRMS (Shuttle Remote Manipulator System) to SSRMS (Space Station RMS) at ~5:08pm, SSPTS (Station-to-Shuttle Power Transfer System) activation at ~6:38pm, and preparations for the first spacewalk, EVA-1, by MS2/EV1 Mastracchio and MS3/EV2 Williams with overnight Campout of the two in the Airlock (A/L) for denitrogenation/pre-breathe. Objectives of the nominal 11-day mission include: Deliver & install the S5 truss element, deliver & replace CMG-3 (Control Moment Gyroscope 3), retract P6 fwd PVR (Photovoltaic Radiator), relocate P6 SASA, install MISSE 3&4, relocate CETA carts 1&2, etc. Depending on successful SSPTS activation, a decision may be made to extend the mission to 14 days, including a fourth EVA on FD10, to install OBSS OSE (Orbiter Boom Sensor System/Orbital Support Equipment) on S1 truss, install two EWIS (External Wireless Instrumentation System) antennas on the Lab, secure Lab and Node MMOD shields, and install WETA-3 (Wireless Video System External Transceiver Assembly #3) on S3 truss. Landing will nominally take place at KSC on FD12 (8/19) at 1:16pm EDT, or, if extended to 14 days, on FD15 (8/22) at 12:48pm.]*

FE-1 Kotov, with TsUP/Moscow support, conducted full-scale testing of the entire OpsLAN (Operations Local Area Network) network to check out yesterday's IFM (in-flight maintenance), which replaced the malfunctioning Russian BRI Smart Switch Router with a new unit delivered on Progress 26P. *[The network testing included activation of the BSMM (Multi-Channel Matching Unit), BSPN (Payload Server), OBC (Onboard Controller) for RokvISS, and GTS (Global Timing System).]*

FE-2 Anderson replaced the BBA (Baseplate Ballast Assembly) of the failed LHA (Lamp Housing Assembly) in the A/L, after Monday's swap of the LHA with a working unit from the Lab did not resolve the issue, pointing to the BBA as the culprit.

Clay and Fyodor also removed their EMUs (Extravehicular Mobility Units) from the A/L to make room for the STS-118 spacesuits.

Earlier in the morning, the FE-2 provided support for the ground-controlled activation of the U.S. CDRA (Carbon Dioxide Removal Assembly) by connecting the LTL coolant supply line to the Lab D6 rack. Later, Clay was to power off the VOA (Volatile Organics Analyzer).

In preparation for the STS-118 RPM (R-bar Pitch Maneuver) tomorrow, Oleg Kotov is to configure the DCS-760 cameras for the photo shoot, and Clay Anderson will likewise set up the video camcorder.

Anderson will also connect the bypass cables for the VDS VTR (Video Distribution System/Video Tape Recorder) for passing video to and from the station on the Lab's starboard side and allowing the station to receive video from the Orbiter on the Lab's port side. The old tapes in the VTRs, having eclipsed their usefulness after 250 hrs, were replaced with new ones.

In preparation for tomorrow's Endeavour docking, CDR Yurchikhin performed the repressurization process on the PMA-2 (Pressurized Mating Adapter #2) and prepared the PMA for the Shuttle's arrival.

The FE-2, at his discretion, is to make preparations and to preposition tools and equipment for the FD3 transfer of oxygen (O<sub>2</sub>) from the Shuttle.

Oleg will collect the standard ammonia fluid sample from the Lab ITCS MTL (Internal Thermal Control System Moderate Temperature Loop) port for 13A.1 return to the ground.

Kotov is also scheduled for the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Yurchikhin and Anderson had another hour for hardware prepacking for return on the Shuttle.

As a recurring item on the Russian voluntary "time permitting" task list, Yurchikhin and Kotov are to perform an equipment audit in the Russian segment (RS) of the ISS, behind stowage panels in the FGB, supported by an uplinked comprehensive list, and to continue shooting photo/video footage of the RS modules' interiors, started before.

Also from the discretionary job list, the FE-1 will conduct the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

The crew is performing their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later, Oleg copies the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~11:08am EDT, Fyodor Yurchikhin powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply), and at 11:14am conducted a radio exchange with ham amateurs/mountain climbers from the Sporadik (Kursk) Youth Sports Club during their climb of the eastern peak of Mt. Elbrus (5642 m above sea level). This was their third radio contact with the ISS crew.

- *26P Dynamic Thruster Test Update:* The retest of the Progress 26P DPO (approach & attitude control) Manifold 1 thrusters was successfully conducted by Energia/Moscow today, first at 6:53am EDT with three firings of 10 sec duration each, and then at 8:20am for a second set of three 10-sec firings. ISS attitude control was handed over to the Russian segment at 6:05am and returned to the U.S. segment at 9:00am.

- *BOK-3 R&R Update*: The replacement of the Russian BOK-3 Command Processing Unit of the TVM/Terminal & TsVM/Central computers with a new unit delivered on 26P is scheduled for 8/12 (~9:51am).
- *STS-118 Orbiter Middeck Payloads*: Three interesting Utilization Sortie experiments are active on the Endeavour middeck during ascent and docked ops: CBTM-2 (Commercial Biomedical Test Module-2), involving three AEMs (Animal Enclosure Modules) with eight mice to study countermeasures for muscle atrophy; CCM-A (Cell Culture Microgravity-A) with two DoD Space Test Program (STP) experiments to study human immune cells and wound healing; and SPEGIS (Streptococcus pneumoniae Gene Expression & Virulence Potential in the Space Environment) to examine the behavior and growth of bacteria in micro-G.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:29am EDT [= epoch]*):

Mean altitude -- 341.3 km

Apogee height -- 346.8 km

Perigee height -- 335.7 km

Period -- 91.36 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008241

Solar Beta Angle -- 48.4 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 83 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49919

**Significant Events Ahead** (*all dates Eastern and subject to change*):

08/10/07 -- STS-118/Endeavour/13A.1 docking (1:51pm)

08/11/07 -- EVA-1 (12:36pm)

08/13/07 -- EVA-2 (11:36am)

08/15/07 -- EVA-3 (11:06am)

08/17/07 -- STS-118/Endeavour/13A.1 undocking (8:28am) -- *if **not** extended to 14 days*

08/19/07 -- STS-118/Endeavour/13A.1 landing (1:16pm)-- *if not extended to 14 days*  
08/17/07 -- EVA-4 (~10:06am) -- *if extended to 14 days*  
08/20/07 -- STS-118/Endeavour/13A.1 undocking (8:00am) -- *if extended to 14 days*  
08/22/07 -- STS-118/Endeavour/13A.1 landing (12:48pm) -- *if extended to 14 days*  
08/29/07 -- SSRMS setup for viewing PMA-3 relocation  
08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
09/??/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/20/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate  
10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/5-8/07 -- Node 2 relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/17/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 [*to be reviewed*]  
02/12/08 -- Progress M-63/28P launch [*to be reviewed*]  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 08/08/07  
**Date:** Wednesday, August 08, 2007 12:38:04 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/08/07**

All ISS systems continue to function nominally, except those noted previously or below.

The crew's sleep/work cycle continues right-shifted by three hours: Wakeup 5:00am EDT, sleep 8:30pm.

As part of their regular physical fitness evaluation, Fyodor Yurchikhin and Oleg Kotov both undertook the Russian MO-5 MedOps protocol of cardiovascular assessment during graded physical load on the VELO cycle ergometer, their second, each assisting the other in turn as CMO (Crew Medical Officer). *[The assessment, supported by ground specialist tagup (VHF) and telemetry monitoring, uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph cuff wired to the cycle ergometer's instrumentation panels. For the graded-load exercise, the subject works the pedals after a prescribed program at load settings of 125, 150, and 175 watts for three minutes each. Data output involves a kinetocardiogram, rheoplethysmogram, rheoencephalogram and a temporal pulsogram.]*

Clay Anderson unstowed the equipment for the SWAB (Surface, Water & Air Biocharacterization) experiment and collected air and surface samples at several times during the day, after taking documentary photographs of the surfaces. The samples were sealed in special SWAB tubes with fixative, labeled as to location origins and prepared for return to Earth. *[SWAB is a comprehensive characterization of microorganisms and allergens in spacecraft. It uses advanced molecular techniques to comprehensively evaluate microbes on board the space station, including pathogens. It also tracks changes in the microbial community as spacecraft visit the station and new station modules are added. This study allows an assessment of the risk of microbes to the crew and the spacecraft.]*

Using the MAS (Microbial Air Sampler) kit, the FE-2 gathered air samples in Lab,

Node & Service Module (SM) for bacterial and fungal analysis in Petri dishes and stowed them for return to Earth on 13A.1. Later, Anderson also collected collect surface sample swabs in Lab & Node for cultivation/incubation with the EHS SSK (Environmental Health Systems/Surface Sample Kit). *[The MAS sampling analysis is performed once per month for the first three months, and once every three months thereafter. Bacterial and fungal air samples are taken at two locations in each module. The colony growth on the sampling slides will usually (not this time) be analyzed on board after five days of incubation in 4 Petri dishes. As done for MAS, SSK sampling is performed once per month for the first three months that a module is on orbit and once every three months thereafter. Bacterial and fungal samples are taken at two locations in each module, with the prime site in the Lab being the air supply diffuser at the LAB1P5 rack. The colony growth on the 10 sampling slides will be analyzed after five days of incubation. For onboard visual analysis of media slides from SSK, MCDs (Microbial Capture Devices) from WMK (Water Monitoring Kit), coliform detection bags from MWAK (Microbial Water Analysis Kit), and Petri dishes from MAS, the crew has a procedure for visual inspection of samples for bacterial and fungal colony growths after appropriate incubation periods.]*

FE-1 Kotov serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The regen process will be terminated at ~7:00pm EDT. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods. Filter bed 1 was regenerated yesterday.]*

After conferring with ground specialists via S-band tagup, CDR Yurchikhin removed the malfunctioning Russian BRI Smart Switch Router in the SM (behind medical cabinet) and replaced it with a new unit delivered on Progress 26P. The installation was then tested from the RSS1 laptop for performance and network connectivity. *[The failure of the BRI was reported by the crew on 6/4, with no spare on board. BRI is part of the RS OpsLAN network with connections to the three SSC (Station Support Computer) clients, the Ethernet tie-in with the US network, and a network printer in the RS (Russian segment). At that time, the crew made do by bypassing the unit by connecting SSC1 directly to the SSC router in the USOS (US segment), making this laptop the only SSC available in the SM. The SM printer could be connected directly to the SSC1 port.]*

Meanwhile, Oleg Kotov conducted a search and audit behind FGB panels of equipment needed for the Russian/Japanese 3DPC experiment, scheduled for Expedition 16 in December. *[3DPC hardware was removed by Valery Tokarev on 3/23/06 as part of closing out the Japanese/JAXA 3D-PCGF (3D Photon Crystals Growth Facility) experiment and may inadvertently have been returned to Earth.]*

*3DPC studies the production of 3D photonic crystals, from UV LEDs, through self-organization and ordering of colloid nanoparticles in an electrolyte solution with subsequent fixation in an elastic gel matrix.]*

Later, the FE-1 worked on the SM's IK0501 GA (gas analyzer) of the SOGS Pressure Control & Atmospheric Monitoring System, deactivating the unit and replacing its BF carbon dioxide (CO<sub>2</sub>) filter assembly with a new unit from FGB stowage (replaced last: 5/18/07). *[After ensuring good seals on the instrument's base and no leaks around the installed filter, Oleg reactivated the GA and stowed the spent BF for disposal. IK0501 is an automated system for measuring CO<sub>2</sub>, O<sub>2</sub>, and H<sub>2</sub>O in the air as well as the flow rate of the gas being analyzed.]*

After reviewing R&R (removal & replacement) procedures for the failed (partially corroded) BOK-3 Command Processing Unit of the Russian (German-built) TVM/Terminal & TsVM/Central computers, Yurchikhin and Kotov tagged up with ground specialists to discuss the upcoming repair with the new BOK-3 delivered on 26P. Oleg then readied the cabling and plugs for the R&R, which should restore the Russian BVS Onboard Computer System to full service. *[Preparatory steps for removing the BOK-3 from behind SM access panels were already taken by Yurchikhin on 7/11.]*

Anderson undertook the monthly FDS PEP (Fire Detection & Suppression/Portable Emergency Provisions) safety inspection/audit. *[The IMS (Inventory Management System)-supported inspection involves verification that PFEs (portable fire extinguishers), PBAs (portable breathing apparatus), QDMAs (quick-don mask assemblies) and EHTKs (extension hose/tee kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware (QDMA inspection was not required this time). In the U.S. segment (USOS), there are a total of 5 PFEs and 7 PBAs, plus 7 QDMAs and 4 EHTKs.]*

Clay completed his second run with the MedOps WinSCAT (Spaceflight Cognitive Assessment Tool) experiment by logging in on the MEC (Medical Equipment Computer) and performing the psychological evaluation exercise on the laptop-based WinSCAT experiment. *[WinSCAT is a time-constrained questionnaire test of cognitive abilities, routinely performed by astronauts aboard the ISS every 30 days before or after the PHS (periodic health status) test or on special CDR's, crewmembers or flight surgeons request.]*

Fyodor conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables, and today also the periodic (~monthly) checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and

DC1.

Oleg did the daily IMS updating, editing its standard “delta file” for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew is performing their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-1, FE-2), and VELO cycle with bungee cord load trainer (CDR).

Later, Clay copies the crew’s exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

As a recurring item on the Russian voluntary “time permitting” task list, Yurchikhin and Kotov are to perform an equipment audit in the Russian segment (RS) of the ISS, behind stowage panels in the FGB, supported by an uplinked comprehensive list, and to continue shooting photo/video footage of the RS modules’ interiors, started before.

Also from the discretionary job list, the FE-1 is to conduct the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

A fourth item on the “time permitting” task list for Oleg is the periodic status check on the long-term BIO-5 Rasteniya-1 (“Plants-1”) micro-G growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse, including a health check on the fans of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS, using the hand to check for air flow of three control box fans and six fans of MID-Lada module. *[Rasteniya-1 examines a variety of different types of plants over multiple generations on ISS.]*

*Go-back:* Yesterday at ~9:20am EDT, Clay Anderson powered up the SM’s amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 9:25am conducted a ham session with students at One Stop Richmond Hill Community Center, Richmond Hill, NY. *[“What are your favorite foods in space and does chocolate taste strange in space”; “Do your children want to travel in space like you and why?”; “Do you have Internet on the ISS and what video games are your favorite (if you have any)?”; “Is the ISS*

*going to become a national laboratory, and what kind of experiments will be most important?”]*

**26P Dynamic Thruster Test Update:** As reported yesterday, the test of Manifold 1 of the 26P DPO thrusters was unsuccessful, because of a missing “Ready” signal (“flag”). Specialists suspect faulty cabling on the US-21 matching unit. Manifold 2 is “Go” for roll control, if necessary (the current nominal thruster configuration is 26P thrusters for pitch & yaw and SM thrusters for roll). After data evaluation, the specialists will recommend a retest at a later date.

**STS-118/Endeavour Launch Update:** The launch window opens tonight at 6:31pm EDT and closes 10 minutes later at 6:41pm. Optimal launch time is 6:36pm. At that time, ISS, having passed over Canada, will be at 44 deg N latitude, 54.8 deg W longitude, i.e., south of St. John’s (Newfoundland) and east of Halifax (Nova Scotia). Probability of KSC weather prohibiting launch remains unchanged at 20% (isolated showers in the vicinity).

- 24-hour delay:

Probability of KSC weather prohibiting launch: 30%

Probability of KSC weather prohibiting tanking: 5%

- 48-hour delay:

Probability of KSC weather prohibiting launch: 20%

Probability of KSC weather prohibiting tanking: 0%

Today’s CEO (Crew Earth Observation) photo targets were **Polar Mesospheric Clouds--PMC, Northern Hemisphere** (*looking left for wispy clouds, well above the horizon in the quadrant NW thru NE. Window of opportunity today was 12 min long. Ground specialists suggested attempting 400 mm-lens views. These indicators applied to several PMC opportunities today*), **Lake Nasser, Egypt** (*crew was asked to shoot the banks of Lake Nasser at nadir*), and **Patagonian Glaciers** (*southern end of this site was clearer—looking right for smaller glaciers, especially on the less cloudy east side of the Andes*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:07am EDT [= epoch]*):

Mean altitude -- 341.4 km

Apogee height – 346.9 km

Perigee height -- 335.9 km  
Period -- 91.36 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0008174  
Solar Beta Angle -- 53.0 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.76  
Mean altitude loss in the last 24 hours -- 70 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49903

**Significant Events Ahead** (*all dates Eastern and subject to change*):

08/08/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3 (6:36pm EDT).  
08/10/07 -- STS-118/Endeavour/13A.1 docking (1:51pm)  
08/11/07 -- EVA-1 (12:36pm)  
08/13/07 -- EVA-2 (11:36am)  
08/15/07 -- EVA-3 (11:06am)  
08/17/07 -- STS-118/Endeavour/13A.1 undocking (8:28am) -- *if not extended to 14 days*  
08/19/07 -- STS-118/Endeavour/13A.1 landing (1:16pm)-- *if not extended to 14 days*  
08/17/07 -- EVA-4 (~10:06am) -- *if extended to 14 days*  
08/20/07 -- STS-118/Endeavour/13A.1 undocking (8:00am) -- *if extended to 14 days*  
08/22/07 -- STS-118/Endeavour/13A.1 landing (12:48pm) -- *if extended to 14 days*  
08/29/07 -- SSRMS setup for viewing PMA-3 relocation  
08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
09/??/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/20/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate  
10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/5-8/07 -- Node 2 relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/17/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/07/07  
**Date:** Tuesday, August 07, 2007 2:19:06 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/07/07**

All ISS systems continue to function nominally, except those noted previously or below.

The crew's sleep/work cycle continues shifted by three hours to the right: wakeup 5:00am EDT, sleep 8:30pm.

The two Russian crewmembers each completed the 2.5-hr Part 2 of their second onboard "Profilaktika" (MBI-8, "Countermeasures") preventive health maintenance fitness test series, including ECG (Electrocardiogram), blood tests and subjective rating. *[Today's fitness test was performed on the TVIS treadmill in unmotorized (idle) mode, with free choice of speeds within the range permitted. The test differs from the normal TVIS session by the use of the TEEM-100 gas analyzer (via a mask equipped with a pneumotachometer sensor), measurement of blood lactate level and subjective evaluation of physical exertion levels during the test. The lactate blood samples were taken twice at the end of the session, using the ACCUSPORT analyzer and REFLOTRON-4 accessories. Results were entered on a log sheet. TEEM and ECG (electrocardiograph) data were transferred to the RSE-Med laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]*

CDR Yurchikhin and FE-1 Kotov had three hours set aside to conduct the Soyuz emergency descent training exercise, standard procedure for each ISS expedition. The exercise, which does not involve any command activation, uses computer simulation on the RSK1 laptop with a descent hand controller (RUS) to set up reentry conditions and switch between modes. It was supported by a tagup and discussions with a ground instructor at TsUP/Moscow via S-band. *[The onboard training (OBT) session included a review of the pertinent RODF (Russian Operations Data Files), specifically the books on Soyuz Insertion & Descent*

*Procedures, Emergency Descents, and Off-Nominal Situation Procedures such as manual undocking. Nominal return of Soyuz 14, with Yurchikhin, Kotov and the Malaysian SFP, is scheduled for 10/21, but station crews must always be prepared for emergency descents. (Note: Expedition 16 crewmembers Whitson & Malenchenko will arrive with the Malaysian SFP on 15S on 10/12.)]*

The FE-1 started the periodic regeneration of the Russian Harmful Impurities Removal System (BMP) by initiating the "bake-out" cycle to vacuum on absorbent bed #1 of the dual-channel filtration system. The bake-out will be terminated at ~7:10pm EDT. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

Yurchikhin prepared ten DCS (Digital Camera System) batteries, eight for the STS-118 RPM (R-bar Pitch Maneuver) and two for the 13A.1 EVA-1, charging four simultaneously for at least three hours, to be moved afterwards to the SM (Service Module) for the DCS-760 camera configuration in preparation for the RPM.

Kotov concurrently reformatted eight 1-GB EVA flash memory cards and PCMCIA 1-GB Microdrives (inside the DCS-760 cameras) using vehicle power, for storage of the RPM imagery. *[Formatting took ~20 minutes/card. After all cards were formatted, the 1-GB EVA Flash Cards were to be moved to the SM for the DCS 760 camera configuration.]*

Also in support of the RPM photo shoot on 8/10, FE-2 Anderson set up the BPSMU (Battery Powered Speaker Microphone Unit) for communications between the crewmembers during the intense shooting activity from SM windows.

Oleg Kotov performed the periodic data collection and downlinking on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G plant growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse.

Clay Sanderson worked in the Airlock preparing the EMU #3008 spacesuit for his EVA-3 spacewalk during the STS-118 docked period, installing the EMU battery and METOX (Metal Oxide) canister, putting EV stripes, patches and flags in place, and replacing the failed helmet light bulb from US EVA-9.

Fyodor performed his routine servicing of the ESA/Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS). *[The CDR first replaced the AST-SM1 spectrometer's PCMCIA memory card (#932) in the AST slot with card #933 and activated the AST, then checked #933 in the RSK1 laptop and ascertained its file quantity and sizes before replacing card #933 in the AST. Previously accumulated data were downlinked from PCMCIA card #932 via OCA*

*and the card returned to its stowage pouch. ALTCRISS uses the AST spectrometer employed by VC8 guest cosmonaut Roberto Vittori in 2005 in the DC1 for the Italian LAZIO (Low Altitude Zone/Ionization Observatory) experiment.]*

Anderson had another go at reloading and repositioning two SSC (Station Support Computer) laptops for the STS-118 crew, for viewing video, which was unsuccessful on 8/5. *[On SSC 1108, Clay was to replace the DVD drive with a new one, and for SSC 1109 new software was uplinked to prevent a procedure error made on 8/5 (by removing the load disk too soon).]*

The CDR conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Working from the discretionary “time permitting” task list, Oleg Kotov did the IMS (Inventory Management System) updating, editing its standard “delta file” for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

FE-2 Anderson had another ~2:15 hrs reserved for hardware prepacking for return on STS-118/13A.1.

Kotov and Yurchikhin had three more hours between them to unload the 26P resupply ship, transfer its cargo to the ISS and keep track of movements in the IMS.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR/MBI-8, FE-1/MBI-8, FE-2), and RED resistive exerciser (FE-2).

Later, Clay will copy the crew’s exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

As a recurring item on the Russian voluntary “time permitting” task list, Yurchikhin and Kotov were to perform an equipment audit in the Russian segment (RS) of the ISS, behind stowage panels in the FGB, supported by an uplinked comprehensive list, and to continue shooting photo/video footage of the RS modules’ interiors, started before.

Also from the discretionary job list, the FE-1 was to conduct the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on

its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 15.]*

*Dynamic 26P Thruster Testing:* After the CDR ensured closure of the protective Lab window shutter, Russian ground controllers conducted the standard firing tests of the Progress 26P DPO (Approach & Attitude Control) thrusters at 10:43am & 12:18pm EDT. The test of Manifold 2 was successful, but the test of Manifold 1 failed because a “Ready” signal (“flag”) was not set. The cause is under investigation. TsUP will make a decision to retest Manifold 1 at a later date. The current thruster configuration is 26P thrusters for pitch & yaw and SM thrusters for roll. *[These dynamic firings test the installation of the electronic US-21 matching unit in the Progress vehicle, performed yesterday (8/6), which connects its motion control and DPO systems to the SM so that they can be commanded by the latter's BVS computer system. They are also used to determine which thruster manifold will be considered the primary one for reboosting and debris avoidance burns. For today's tests, conducted from the SM MCS (Motion Control System) via the US-21, station attitude was handed over from USOS to the Russian segment MCS at 10:15am. Afterwards, control authority was returned to the U.S. CMGs for Momentum Management in LVLH XVV at 12:40pm.]*

*STS-118/Endeavour Launch Update:* The launch window opens tomorrow, 8/8, at 6:31pm EDT and closes 10 minutes later at 6:41pm. Optimal launch time is 6:36pm. Probability of KSC weather prohibiting 8/8 launch: 20% (isolated showers in the vicinity);

Probability of KSC weather prohibiting 8/8 tanking: 10%;

- 24-hour delay:

Probability of KSC weather prohibiting launch: 30%

Probability of KSC weather prohibiting tanking: 5%

- 48-hour delay:

Probability of KSC weather prohibiting launch: 20%

Probability of KSC weather prohibiting tanking: 0%

Today's CEO (Crew Earth Observation) photo targets were **Polar Mesospheric Clouds--PMC, Northern Hemisphere** (looking left for wispy clouds, well above the horizon in the quadrant NW thru NE. Window of opportunity today was 17 min long. The ground suggested attempting 400 mm lens views. These indicators apply to subsequent PMC opportunities today. Images have been received of definite PMC taken shortly before CEO researchers activated their formal PMC request for imagery), **A22 Iceberg, S. Atlantic Ocean** (this may have been the crew's last opportunity to image this iceberg for a while. As before, weather conditions were not optimal, but the crew may have seen the two halves of this major berg between cloud masses, just left of track), and **Haze front, Bahamas**

*(haze composed mainly of smog, with only minor components of smoke and dust, is blowing southward off the continental US, reaching the Bahamas. Between the haze and clear oceanic air there is a marked front. Looking left from the ISS pass, the crew should have seen this smog front curving around the low pressure system).*

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 7:45am EDT [= epoch]):*

Mean altitude -- 341.4 km  
Apogee height -- 347.1 km  
Perigee height -- 335.8 km  
Period -- 91.36 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0008362  
Solar Beta Angle -- 57.3 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.76  
Mean altitude loss in the last 24 hours -- 40 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49887

**Significant Events Ahead** *(all dates Eastern and subject to change):* **[new dates & times!]**

08/08/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3 (6:36pm EDT).  
08/10/07 -- STS-118/Endeavour/13A.1 docking (1:51pm)  
08/11/07 -- 13A.1 EVA-1 (12:36pm)  
08/13/07 -- 13A.1 EVA-2 (11:36am)  
08/15/07 -- 13A.1 EVA-3 (11:06am)  
08/17/07 -- STS-118/Endeavour/13A.1 undocking (8:28am) -- *if not extended to 14 days*  
08/19/07 -- STS-118/Endeavour/13A.1 landing (1:16pm)-- *if not extended to 14 days*  
08/17/07 -- EVA-4 (~10:06am) -- *if extended to 14 days*  
08/20/07 -- STS-118/Endeavour/13A.1 undocking (8:00am) -- *if extended to 14 days*  
08/22/07 -- STS-118/Endeavour/13A.1 landing (12:48pm) -- *if extended to 14 days*  
08/29/07 -- SSRMS setup for viewing PMA-3 relocation  
08/30/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

09/??/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/20/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/10/07 -- Soyuz TMA-11/15S launch (9:21am)  
10/12/07 -- Soyuz TMA-11/15S docking (FGB nadir port) (10:47am)  
10/21/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing (3:15am/6:32am)  
10/23/07 -- STS-120/Discovery/10A launch -- Node 2 "Harmony", racks; P6 relocate  
10/25/07 -- STS-120/Discovery/10A docking  
11/03/07 -- STS-120/Discovery/10A undocking  
11/5-8/07 -- Node 2 relocation; PMA2 relocation  
11/13/07 -- US EVA-10  
11/17/07 -- US EVA-11  
12/06/07 -- STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- STS-122/Atlantis/1E docking  
12/15/07 -- STS-122/Atlantis/1E undocking  
12/22/07 -- Progress M-61/26P undocking (DC1) & reentry  
12/23/07 -- Progress M-62/27P launch  
12/25/07 -- Progress M-62/27P docking (DC1)  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/06/07  
**Date:** Monday, August 06, 2007 1:12:01 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/06/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 16 of Increment 15.*

The crew's sleep/work cycle continues shifted by three hours: wakeup 5:00am, sleep 8:30pm EDT.

Yurchikhin, Kotov and Anderson started out before breakfast with the Russian biomedical routine assessments of PZeh-MO-7/Calf Volume Measurement and PZeh-MO-8/Body Mass Measurement (seventh time for CDR & FE-1, fourth for FE-2), using the IM mass measurement device which Oleg Kotov afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference pints, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

Later in the day, the two Russian crewmembers also completed a 2h 30m session each of Part 1 of their second onboard "Profilaktika" (MBI-8, "Countermeasures") preventive health maintenance fitness test series, starting with the VELO stationary cycle ergometer. *[Fyodor and Oleg will do an additional part of the test tomorrow (8/7) on the TVIS treadmill. Test procedure for MBI-8 is identical to the Russian MO-5 assessment, but in addition to the nominal procedure it uses the TEEM-100M gas analyzer with breathing mask, a blood lactate test with the ACCUSPORT analyzer and REFLOTRON-4 accessories, and a subjective evaluation of physical*

*exertion levels during the test (using the Borg Perceived Exertion Scale, viz., 10 steps from very light over hard and very hard to maximum). Results are entered on a log sheet. TEEM and ECG (electrocardiograph) data are transferred to the RSE-Med Laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]*

Much of today's work is focusing on Progress M-61/26P unloading, starting with Yurchikhin removing the docking mechanism (StM, *Stykovochnovo mekhanizma*) between the cargo ship and the DC1 Docking Compartment. *[The StM is the "classic" probe-and-cone type, consisting of an active docking assembly (ASA) with a probe (SSh), which fits into the cone (SK) on the passive docking assembly (PSA) for initial soft dock and subsequent retraction to hard dock. The ASA is mounted on the Progress' cargo module (GrO), while the PSA sits on the docking ports of the SM, FGB and DC1.]*

With the passageway to 26P thus freed, FE-1 Oleg Kotov and the CDR have three hours between them to unload the resupply ship, transfer its cargo to the ISS and update the IMS accordingly.

Working in the cargo ship (TKG), Oleg Kotov installed the LKT local temperature sensor commutator (TA251MB) of the BITS2-12 onboard telemetry measurement system, along with its ROM unit (read-only memory, TA765B), a 1-hr. job. The LKT was subsequently switched on by the ground to complete the basic configuration. He then completed the electronic integration of 26P into the ISS by installing the standard US-21 matching unit, another 1-hr. task. *[The US-21 matching unit connects the SM with the Progress motion control and DPO thrusters systems, so that they can be commanded by the SM computer system (BVS). After bolting the box down, Oleg hooked up its the telemetry (TM) connector to the BITS2-12 onboard TM system on Go from TsUP, after Moscow had inhibited data output to the VD-SU control system mode, powered off the BITS and deactivated the Elektron and the SKV-1 air conditioner. These systems were subsequently turned back on. A dynamic thruster test of the installation is scheduled tomorrow.]*

As part of Progress unloading, Kotov transferred the new hardware of the Japanese experiment GCF-JAXA (Granada Crystallization Facility) to the Service Module (SM) for installation in the Russian TBU incubator (set up 8/3 & 8/4), maintained at +20 degC. The configuration was photographed for documentary purpose with the Nikon D1X camera, and the container for the crystallizer gear was discarded.

Yurchikhin unloaded four BIOEKOLOGIA containers (#13/#14/#15/#17) of the

BTKh-31 ANTIGEN experiment from 26P and set up the Bioecology kits #4 & #5 at their exposure location in the DC1 Docking Compartment, followed by documentary photography.

Working in the Airlock (A/L) on EVA-related maintenance tasks, Yurchikhin set up and started the periodic scrubbing process on the cooling water loops of EMU (Extravehicular Mobility Unit) #3006 & #3008, by initiating their ionic and particulate filtration, one at a time. *[Purpose of the scrubbing, including iodination of the LCVGs (Liquid Cooling & Ventilation Garments) for biocidal maintenance, is the elimination of any biomass (organic) and particulate matter that may have accumulated in the loops.]*

FE-2 Anderson had another ~4.5 hrs reserved for hardware prepacking for return on STS-118/13A.1.

Anderson also removed and replaced the failed LHA (Lamp Housing Assembly) in the A/L, using a serviceable unit from a crew-preference location.

The FE-2 worked on returning ER4 (EXPRESS Rack 4) to its nominal configuration by resetting the OCA Router to the APS1/APS2 (Automated Payload Switches 1/2) after reconnecting the HRDL (High Data Rate Link) fiber optics cable at the LAB1P2 UIP (Utility Interface Panel, "Z-panel").

Additionally, Clay updated the three onboard Emergency/Warning Books (in Lab, FGB and SM) with new uplinked procedures.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1, both for MBI-8).

Later, Clay copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The CDR conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Fyodor also did the IMS (Inventory Management System) updating, editing its standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

As a recurring item on the Russian voluntary “time permitting” task list, Yurchikhin was asked to continue the equipment audit in the Russian segment (RS) of the ISS, behind stowage panels in the FGB, supported by an uplinked comprehensive list.

Also from the discretionary job list, the CDR was to replace procedures pages in Russian ODF (Operation Data File) books with new updates delivered on Progress 26P.

Another discretionary-choice task was for Kotov to shoot photo/video footage of the RS modules’ interiors, started before.

A fourth item on the “time permitting” task list for Oleg was the periodic status check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse, including a health check on the fans of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS, using the hand to check for air flow of three control box fans and six fans of MID-Lada module.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:36am EDT [= epoch]*):

Mean altitude -- 341.5 km

Apogee height – 347.1 km

Perigee height -- 335.8 km

Period -- 91.36 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.00084

Solar Beta Angle -- 61.0 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in the last 24 hours -- 70 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49871

**Significant Events Ahead** (*all dates Eastern and subject to change*):

08/08/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3 (~6:36pm EDT).

08/10/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
08/20/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/22/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/05/07  
**Date:** Sunday, August 05, 2007 8:43:45 PM  
**Attachments:**

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**ISS On-Orbit Status 08/05/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday --- Progress docking day for Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Clay Anderson). Ahead: Week 16 of Increment 15.*

**Yest kasaniye!** Progress M-61 (26P), approaching from below the station, docked flawlessly at the DC1 Docking Compartment nadir port at 2:40pm EDT, followed by docking probe retraction and hook closure ("sborka") at 2:50pm after motion damp-out, while the ISS was in LVLH (local vertical/local horizontal) attitude. Hatches were reported open at 5:45pm. All Progress systems operated nominally from Automated Rendezvous start at approximately 2:30pm. *[Launched on 8/2 (1:33pm EDT), the 26P resupply drone delivered about 2.5 tons of cargo for the ISS crews, including propellants for the Russian thrusters, fresh water, oxygen, food, spare parts, repair gear, life support and science experiment hardware. For the docking, ISS attitude control authority was handed over to Russian MCS (Motion Control System) thrusters at 12:10pm and returned to US Momentum Management at 5:40pm.]*

After wake-up at 5:00am EDT, shifted by three hours, and breakfast, CDR Yurchikhin and FE-1 Kotov set up the work area for the Russian science payload MBI-22 BIMS and unstowed the hardware. For the subsequent experiment activity, Kotov was the subject, with Yurchikhin assisting, supported by ground specialist tagup. Previously, on 5/11, Yurchikhin was the subject. *[BIMS objective is to conduct several experimental sessions in the RS (Russian segment) for filming skin portions and mucous membranes of crewmembers, involving otoscopic, nasal, dental and dermatoscopic examinations. It is part of a comprehensive research into using telemedical technologies for getting information from distant space crews for medical support of human space missions and information for life science flight studies. The BIMS experiment uses image capturing (video & still photo), an*

*otoscope (or auriscope - the familiar medical device for visualizing the outer & middle ear, nose and upper throat area), the RSE-med A31p laptop and PCMCIA memory cards, to be returned to the ground to study small skin sites, conduct otorhinolaryngologic examinations (external acoustic meatus, eardrums, nasal passages), and do stomatologic (i.e., medical study of mouth and its diseases) examination of gums and teeth.]*

The FE-1 deactivated the gas analyzer in the Soyuz 14S, docked to the FGB Nadir port, which had been running since 8/2.

Before monitoring the approach & docking from the TORU station in the Service Module (SM), CDR Yurchikhin, FE-1 Kotov and FE-2 Anderson completed final preparations for the Progress arrival, starting with deactivation of amateur (ham) radio equipment in the ISS to prevent any interference with Progress/KURS radio traffic, taking blank photos with the DCS (Digital Camera System) as test shots, closing of the Lab science window shutter for protection against thruster plume contamination, and activation of the SSC6 (Station Support Computer 6) A31p laptop in the FGB for handling the video transmission from the Russian segment (RS) via the Ku-band assets in the USOS. *[The A31p used for the routing from the SM is located in the FGB since available cables are not long enough to extend to the Node. The video signal is fed from there via coaxial cable to the SSC Operations LAN (local area network) and from there into the Ku-band system for subsequent conversion from the Russian SECAM format to the American NTSC format on the ground.]*

The crew monitored the docking process from the TORU (teleoperated approach & docking system) station, on "hot standby", and took photography of the Progress approach and linkup.

After the docking, the FE-1 shut off TORU and began reconfiguring STTS communications, with FE-2 Anderson also tearing down the TV Ku-band connection through the US segment (USOS) via the A31p laptop (which was also shut down).

The crew then conducted the standard one-hour leak checking of the docking vestibule and fuel/oxidizer transfer line interface between Progress and DC1. During leak checking and initial clamp installation, Russian thrusters were inhibited (as they were during docking).

After hatch opening (5:45pm), Fyodor and Oleg first installed the QD (quick disconnect) screw clamps (BZV) of the docking & internal transfer mechanism (SSVP) to rigidize the coupling, and the CDR removed the PkhO/DC1 (SU) hatch cover, reinstalled the IP-1 airflow sensor and assembled the ventilation/heating air duct.

Next, Kotov performed the standard air sampling inside the Progress with the Russian AK-1M air sampler, then deactivated the cargo ship.

Besides Progress arrival/docking support, crew activities included another 2.5 hrs of hardware prepacking for return on STS-118/13A.1 by Anderson.

Clay also had two hours of work in the U.S. Airlock where he prepared and configured EVA systems and tool caddies for the 13A.1 spacewalks. As part of this task, Clay performed some steps in support of ground-controlled O<sub>2</sub> Hi-P leak checking (see item below).

Oleg conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

The FE-1 also gathered data on total operating time & "On" durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

Clay attempted to load two SSC (Station Support Computer) laptops for use by the STS-118 crew (to view video) but was not successful. Ground specialists are developing a forward plan.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), and RED resistive exerciser (CDR, FE-1, FE-2).

Sleep time tonight began at a shifted 8:30pm (wake-up tomorrow: 5:00am).

*Oxygen High-Pressure System Leak Check:* The US O<sub>2</sub> Hi P Supply System has always exhibited a very small leak (within design specifications) downstream of the O<sub>2</sub> Hi P Supply valve. During a data review following the recent US EVA-9, it was discovered that the leakage rate has increased significantly to a new observed leak rate of 7 lbm/year. Crew and ground specialists are troubleshooting, but this is not an impact to EVA operations.

### **Weekly Science Update** (*Expedition Fifteen -- 15<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* A crew

check activity was performed on 7/27. The new file found on the card had a file size of 0kB. Moreover, the compact flash memory card was hotter than usual. New card was inserted for recording during some hours. File size was now much larger than expected (equivalent to 20 days of recording). It was decided to power ALTEINO off until further analysis on ground. Files were downlinked, and assessment of the ALTEINO telemetry did not show any abnormal temperature behavior at payload level. Decision was made on 8/2 to recommend to power the instrument again, and proceed with a new card. Next ALTCRISS operations are currently scheduled on 8/7, with memory card exchange and subsequent downlink of files.

*ANITA*: Planned.

*BCAT (Binary Colloidal Alloy Test)*: Reserve.

*CARDIOCOG-2*: Next session scheduled around 9/10.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS)*: Continuing,

*CFE (Capillary Flow Experiment)*: Reserve.

*CHROMOSOME-2 (E14 SFP)*: Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus)*: Powered off. Waiting to support other experiments such as BCAT.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2)*: Powered off. Contains CSI-01, awaiting return home on 13A.1.

*EarthKAM (Earth Knowledge Acquired by Middle School Students)*: Next scheduled operation is 10/29-11/3.

*EMCH (Elastic Memory Composite Hinge)*: Complete.

*EPO (Educational Payload Operation) Kit C*: Planned.

*IMMUNO (Saliva Sampling)*: First session completed successfully on 7/27. Next session to be planned at the end of the Increment.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*: Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* Planned

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* Planned.

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION:* "Clay, great work on Wednesday. And thanks a bunch for reporting down all the tube numbers and bar codes."

*SAMPLE:* Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 7/30 the ground has received a total of 9,307 CEO images for review and cataloging for Increment 15. This week researchers received frames with camera times corresponding to the following CEO Target List requests: Kellogg Biological Station, Michigan; Vredefort Impact Crater, South Africa; and Patagonian Glaciers. As these are cataloged, feedback on them will be provided to the crew next week. "We are continuing to work issues related to changes in the processing and delivery of your imagery for our review. We regret that these changes have delayed our efforts to provide you timely feedback on your photography efforts. Your striking image of the Bechar Basin in northwestern Algeria will be posted on NASA/GSFC's Earth Observatory website this weekend.

Your oblique view in low light accentuates the cliff and dune features and provides a fine sense of topography of the region.”

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

### **Significant Events Ahead** (*all dates Eastern and subject to change*):

08/08/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3 (~6:36pm EDT).

08/10/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)

08/20/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)

08/22/07 -- STS-118/Endeavour/13A.1 landing

08/??/07 -- SSRMS setup for viewing PMA-3 relocation

08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]

09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1) & reentry

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)

10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing

10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 “Harmony”, racks [*under review*]

10/20/07 -- (NET) STS-120/Discovery/10A docking

10/22/07 -- (NET) Node 2 relocation

10/29/07 -- (NET) STS-120/Discovery/10A undocking

11/06/07 -- US EVA-10

11/14/07 -- US EVA-11

11/20/07 -- US EVA-12

12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- (NET) STS-122/Atlantis/1E docking

12/12/07 -- Progress M-62/27P launch [*to be reviewed*]

12/13/07 -- (NET) STS-122 undocking

12/14/07 -- Progress M-62/27P docking

??/??/08 -- ATV-1 “Jules Verne” launch/Ariane V (Kourou, French Guyana)

??/??/08 -- ATV-1 docking (SM aft port)

02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/04/07  
**Date:** Saturday, August 04, 2007 4:25:40 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/04/07**

All ISS systems continue to function nominally, except those noted previously or below. *Off-duty day for the crew except for housekeeping and voluntary work.*

**Progress M-61/26P is continuing its 3-day** flight to the ISS for docking tomorrow (8/5) at ~2:39pm EDT at the DC1 nadir port. All onboard tests (TV, KURS, TORU), performed during RGS (Russian ground site) passes, were without issues.

The crew conducted the regular weekly three-hour task of thorough station cleaning. [*"Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.*]

As part of the house cleaning, Fyodor and Oleg performed preventive maintenance cleaning on SM fans & grilles VPkhO, VdPrK, VPrK, and on the V3 ventilator grill in the DC1 (Docking Compartment).

In preparation for science payloads arriving on Progress 26P, FE-1 Kotov activated the TBU-04 (Universal Bioengineering Thermostat #4) for the Kriogem-03M refrigerator in the Service Module (SM) in the thermostatic mode set at +20 deg, which he installed yesterday.

Yurchikhin and Kotov tagged up with ground specialists to discuss the photo/video results of the standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training performed by them on 8/1.

At ~10:05am EDT, the crew members held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

The CDR conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

After lunch, Clay Anderson filled out the regular FFQ (Food Frequency Questionnaire), his sixth, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

At ~12:50pm, Anderson had a PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

At ~4:33pm, Clay also had a private Crew Discretionary Conference via Ku- & S-band.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later, Oleg copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~5:10pm, the FE-2 conducted an amateur radio session with youngsters at the 21<sup>st</sup> World Scout Jamboree in Chelmsford, England.

Working off the Russian discretionary "time permitting" task list, Kotov performed the periodic status check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse.

**Significant Events Ahead** *(all dates Eastern and subject to change):*

08/05/07 -- Progress M-61/26P docking (DC1 nadir, ~2:39pm EDT)  
08/08/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3 (~6:36pm EDT).  
08/10/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
08/20/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/22/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks *[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.

04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 08/03/07  
**Date:** Friday, August 03, 2007 4:34:10 PM  
**Attachments:** [image001.gif](#)  
[image002.gif](#)

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### **ISS On-Orbit Status 08/03/07**

All ISS systems continue to function nominally, except those noted previously or below. *The crew has an off-duty day.*

**Progress M-61/26P is continuing its rendezvous flight to the ISS.** All onboard tests (TORU, TV, etc.) have been nominal to date. 26P is currently "barbecuing" around its roll axis for thermal control. Docking is set for Sunday, 8/5, at 2:39pm EDT at the DC1 nadir port. Hatch opening ~5:30pm. **[Pictures of yesterday's launch, see below.]**

At ~4:15am EDT, CDR Yurchikhin and FE-1 Kotov held a teleconference with TsUP/Moscow on Progress 26P docking specifics, reviewing TORU operations with ground specialists.

Afterwards, Yurchikhin and Kotov set up the Russian video equipment, configured with the A31p laptop in the FGB and drag-thru cable to U.S. Ku-band assets, for video coverage of the cargo ship's docking on Sunday. After testing the downlink, the A31p was deactivated for the time being.

FE-1 Kotov unstowed the TBU-04 (Universal Bioengineering Thermostat #4) for the Kriogem-03M refrigerator from the FGB, assembled it and installed it in the Service Module (SM).

Clay Anderson completed the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). There was no need to change batteries out since they will be returned on 13A.1.

Clay also retrieved and stowed the two FMKs (Formaldehyde Monitoring Kits) deployed on 8/1 in the Lab (below CEVIS cycle) and SM (most forward handrail).

Oleg conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Fyodor performed the weekly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), checking the condition of the roller bearings and record its time & date values.

At ~5:15am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~9:30am, the station crew held a teleconference with the STS-118/13A.1 crew via Ku- & S-band, for early "handover" purposes.

At ~12:25pm FE-2 Anderson held two crew discretionary conferences via S- & Ku-band, with KHAS-TV Hastings, NE, KFOR Radio - Lincoln, NE, and the Omaha World Herald.

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio was held at ~2:45pm.

At ~3:30pm, Anderson had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later, Clay copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*S-band String Swap:* At 1:32am this morning, MCC-H performed an S-band String Swap from String 2 to String 1. S-Band String 1 will remain as the active String until 8/5 (4:15am) when an additional String Swap from String 1 to String 2 will be performed. Houston is performing these String Swaps in order to gain confidence on String 1 prior to 13A.1.

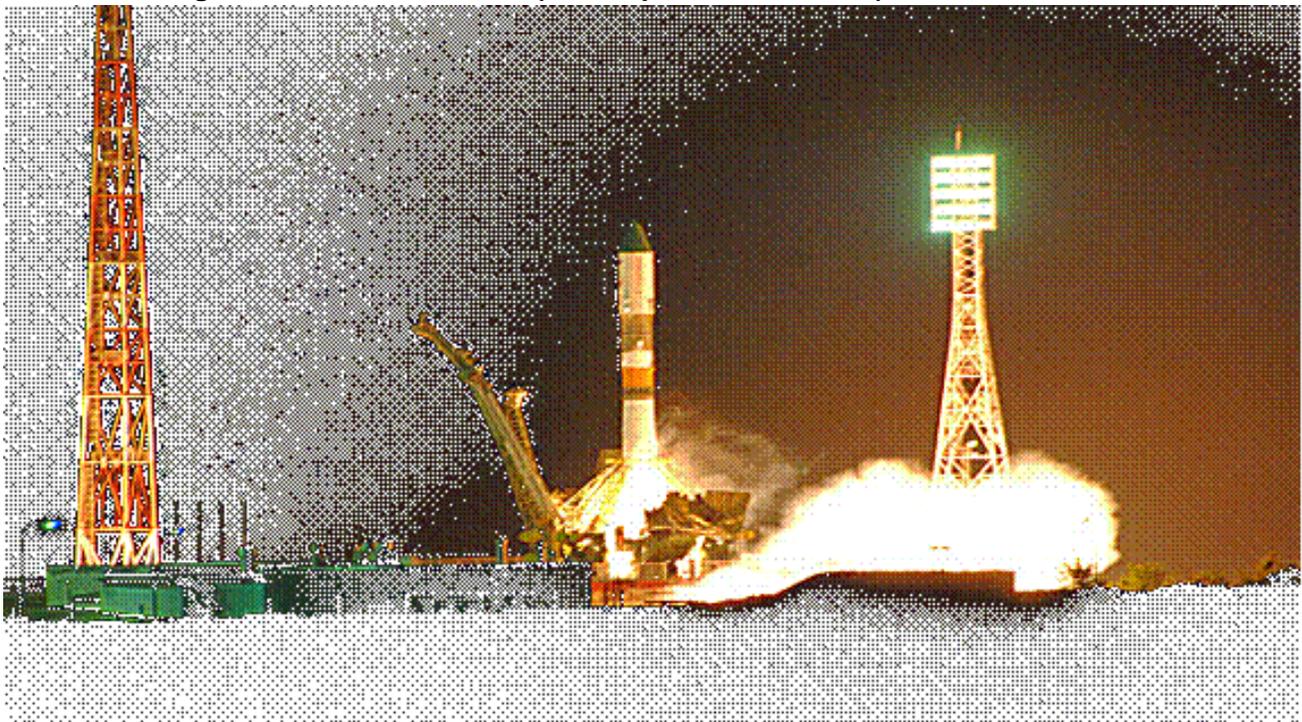
*STS-118/Endeavour Launch Slip:* Due to last week's adverse weather affecting the work at the launch pad, the launch of STS-118 has been moved one day to Wednesday, 8/8 (6:36pm EDT).

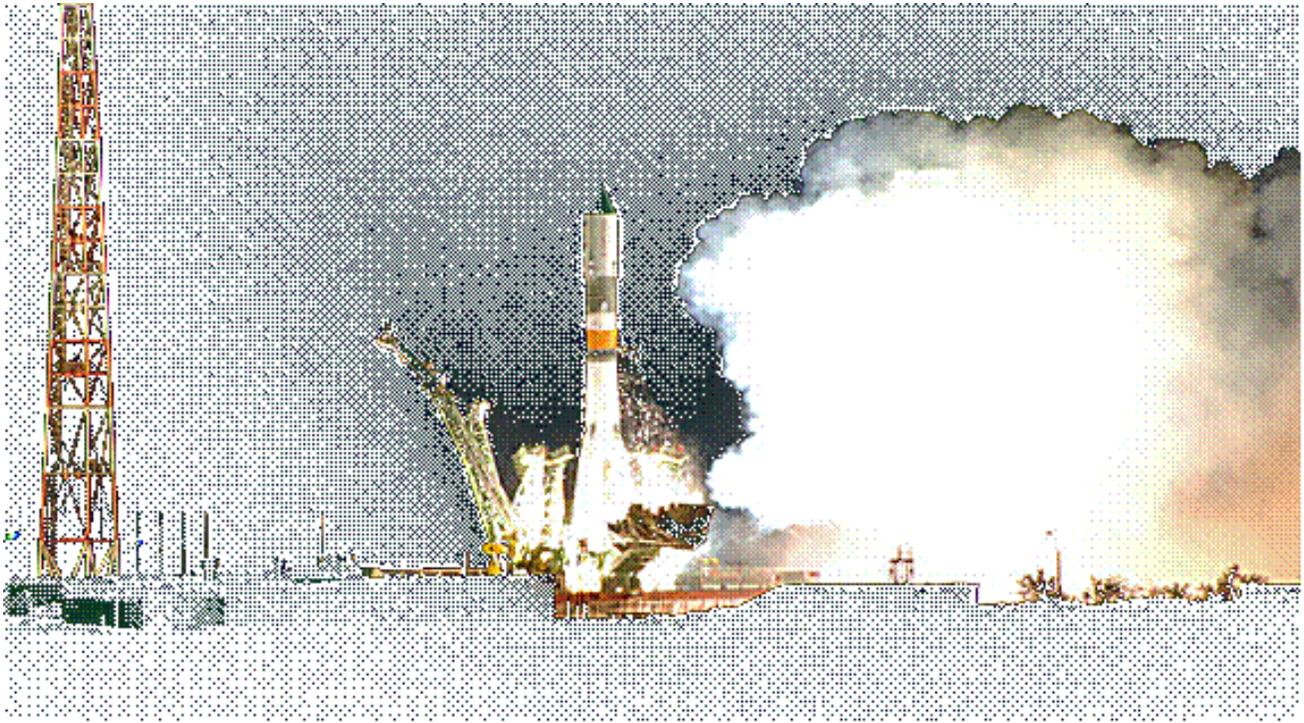
**Significant Events Ahead** (*all dates Eastern and subject to change*):

- 08/05/07 -- Progress M-61/26P docking (DC1 nadir, ~2:39pm EDT)
- 08/08/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3 (~6:36pm EDT).
- 08/10/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)
- 08/20/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)
- 08/22/07 -- STS-118/Endeavour/13A.1 landing
- 08/??/07 -- SSRMS setup for viewing PMA-3 relocation
- 08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)
- 08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*
- 09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)
- 10/01/07 -- Progress M-61/26P undocking (DC1) & reentry
- 10/02/07 -- Soyuz TMA-11/15S launch
- 10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)
- 10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing
- 10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks *[under review]*
- 10/20/07 -- (NET) STS-120/Discovery/10A docking
- 10/22/07 -- (NET) Node 2 relocation
- 10/29/07 -- (NET) STS-120/Discovery/10A undocking
- 11/06/07 -- US EVA-10
- 11/14/07 -- US EVA-11
- 11/20/07 -- US EVA-12
- 12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite
- 12/08/07 -- (NET) STS-122/Atlantis/1E docking
- 12/12/07 -- Progress M-62/27P launch *[to be reviewed]*

12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**Launch of Progress M-61/26P on 8/2/07 (9:33:48pm Moscow Time)**





**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 08/02/07  
**Date:** Thursday, August 02, 2007 7:35:05 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/02/07**

All ISS systems continue to function nominally, except those noted previously or below.

**Progress M-61/26P launched nominally at Baikonur at 1:33pm EDT.** The antennae and solar arrays were deployed without issue at 1:42pm. Docking is scheduled for Sunday, 8/5, at 2:39pm EDT.

Before breakfast, FE-2 Anderson completed the last day of his third session with the NASA/JSC experiment NUTRITION. During today's part, he collected another urine sample for storage in the MELFI (Minus-Eighty Laboratory Freezer for ISS). The sampling kit was then stowed away. *[The current NUTRITION project expands the previous Clinical Nutritional Assessment profile (MR016L) testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

The two Russian crewmembers worked in the Progress M-60/25P vehicle, dismantling the Kurs-A rendezvous & approach radar system of its motion control & navigation system (SUDN) and removing it from the logistics drone, a 3-hr. job. These valuable components, stowed in the FGB, will be returned to Earth on the Shuttle for reuse. *[KURS-A is the active half of the Russian space program's proven S-band radar system for automated flight, which measures relative motion parameters between Progress (or Soyuz) and the ISS during rendezvous operations, to enable the autopilot's calculation of corrective impulses. The system's passive transponder counterpart (KURS-P) is on the Service Module (SM), with one antenna each at the tip of the two solar array wings.]*

As part of their regular monthly fitness evaluation, Fyodor Yurchikhin and Oleg

Kotov undertook their first session of the Russian MO-5 MedOps protocol of cardiovascular evaluation in the below-the-waist reduced-pressure device (ODNT, US: LBNP) on the VELO ergometer, assisting each other in turn as CMO (Crew Medical Officer). *[The assessment, supported by ground specialist tagup (VHF) and telemetry monitoring from Russian ground sites (at 7:01am & 8:51am), uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph cuff wired to the cycle ergometer's instrumentation panels. The Chibis ODNT provides gravity-simulating stress to the body's cardiovascular/circulatory system for evaluation of Yurchikhin's and Kotov's orthostatic tolerance (e.g., the Gauer-Henry reflex) after several weeks in zero-G.]*

FE-2 Anderson conducted the periodic smoke detector inspection in the U.S. Airlock, Lab and Node.

Anderson also completed the periodic CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout on the prime unit (#1060) and backup unit (#1057). *[Clay changed out the prime unit's battery, then zero-calibrated both instruments. Following zero calibration, the backup unit was stowed, while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

FE-1 Kotov conducted the periodic sampling of cabin air for subsequent analysis on the ground, first employing the IPD-CO Draeger tubes sampler to check for CO (Carbon Monoxide) in the SM, then using the Russian AK-1M adsorber to sample the air in the SM and FGB and to check for leaked-out Freon in the SM.

Clay Anderson supported the sampling by collecting air specimen with the GSC (Grab Sample Container) at the center of the SM and Lab.

The CDR activated the gas analyzer in the Soyuz 14S, docked to the FGB Nadir port,

The FE-2 conducted the weekly 10-min CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water callowns are sent up every other week.]*

Clay also did the regular bi-weekly maintenance reboot of the SSC (Station Support Computer) File Server and OCA Comm Router laptops as well as the weekly reboot of the PCS (Portable Computer System) A31p laptops.

Kotov conducted the routine maintenance of the SOZh system (Environment

Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables, and today also the periodic (~monthly) checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

Yurchikhin did the IMS (Inventory Management System) updating today, editing its standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-1, FE-2), and VELO cycle with bungee cord load trainer (CDR).

Later, Fyodor copied the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Yurchikhin and Anderson had 3.5 hrs between them for hardware prepacking for return on STS-118/13A.1.

**Significant Events Ahead** (*all dates Eastern and subject to change*):

- 08/05/07 -- Progress M-61/26P docking (DC1 nadir, ~2:39pm EDT)
- 08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3
- 08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)
- 08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)
- 08/21/07 -- STS-118/Endeavour/13A.1 landing
- 08/??/07 -- SSRMS setup for viewing PMA-3 relocation
- 08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)
- 08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]
- 09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)
- 10/01/07 -- Progress M-61/26P undocking (DC1) & reentry
- 10/02/07 -- Soyuz TMA-11/15S launch
- 10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)
- 10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing
- 10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks [*under review*]
- 10/20/07 -- (NET) STS-120/Discovery/10A docking
- 10/22/07 -- (NET) Node 2 relocation
- 10/29/07 -- (NET) STS-120/Discovery/10A undocking
- 11/06/07 -- US EVA-10
- 11/14/07 -- US EVA-11
- 11/20/07 -- US EVA-12

12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 08/01/07  
**Date:** Wednesday, August 01, 2007 7:59:08 PM  
**Attachments:**

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### **ISS On-Orbit Status 08/01/07**

All ISS systems continue to function nominally, except those noted previously or below.

**Progress M-59/24P undocked successfully from the DC1 port** at 10:07am EDT. *[To perform the separation burn (at ~2:42pm), the crew had to intervene, turning on the TORU system to clear inhibiting parameters still remaining from the TORU checkout a week earlier.]*

Today's crew activity began with the routine checkup of Docking Compartment (DC1) circuit breakers and fuses by CDR Yurchikhin and FE-1 Kotov. *[The monthly checkup in the "Pirs" DC1 looks at AZS circuit breakers on the BVP Amp Switch Panel (they should all be On) and the LEDs (light-emitting diodes) of 14 fuses in Fuse Panels BPP-30 & BPP-36.]*

Before breakfast, FE-2 Anderson began his third session with the NASA/JSC experiment NUTRITION, for which he had to forego exercising and food intake for eight hours. *[After collecting an initial urine sample, Clay followed it with phlebotomy, i.e., drawing blood samples (from an arm vein) which he first allowed to coagulate, then spun in the HRF RC (Human Research Facility/Refrigerated Centrifuge) and finally placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. The equipment was then stowed. NUTRITION activities today included the required 24-hour data urine collection by Anderson, by securing samples during the day, all stored immediately in MELFI. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of*

*countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

CDR Yurchikhin had two hours reserved to work on the Service Module (SM) ventilation system, removing & replacing the VGZhT1 & VGZhT4 fans and installing shock absorbers (noise dampers/suppressors).

Before the ventilation system IFM (Inflight Maintenance), the FE-1 conducted noise level measurements in the SM, using the U.S. SLM (sound level meter) for an acoustic survey to measure background noise before the installation of the new sound deadening vibration isolators and VGZhT1/VGZhT4 fans. SLM data were transferred to the MEC (Medical Equipment Computer) for subsequent downlink. *[Noise level measurements were done in two phases with VGZhT1 & VGZhT4 running, - (1) with all ventilation system fans running, and (2) with fans VVPrK, VPO10, VKYu1/2 & VPF1/2 shut down.]*

For the upcoming SSRMS (Space Station Remote Manipulator System) operations during the 13A.1 docked period, FE-1 Kotov and FE-2 Anderson conducted a teleconference with Robotics specialists via S- band, then set up the ROBoT simulator equipment and ran a Robotics/MSS (Mobile Service System) skill training session. Later, Kotov terminated the session and stowed the gear.

Anderson had another hour set aside for hardware prepacking for return on 13A.1/ Endeavour.

Yurchikhin and Kotov completed the standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, using their DCS-760 digital still cameras with 400 & 800mm lenses at SM windows 6 & 8 to take target imagery. Later (~8:35am), Fyodor downlinked the obtained OBT images to the ground for analysis. The skill training prepares the crew for the bottom side mapping of the Orbiter at the arrival of STS-118/13A.1. *[During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Endeavour, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

After the Progress 24P separation, on TsUP/Moscow “Go-ahead”, the CDR was to switch the DC1-Nadir port PEV (Pressure Equalization Valve) to the Closed position.

Anderson disconnected the ITCS LTL (Internal Thermal Control, System/Low Temperature Loop) cooling line QD (Quick Disconnect) which he had configured yesterday for the CDRA sock filter maintenance.

As a regular periodic task, the FE-1 deployed two passive FMK (Formaldehyde Monitoring Kit) sampling assemblies in the Lab (below CEVIS) and Service Module (SM, most forward handrail), to catch any atmospheric formaldehyde on a collector substrate for subsequent analysis on the ground.

The CDR performed the periodic (about twice a month) replenishing of the Elektron’s water supply for electrolysis, filling the KOV thermal loops’ EDV container with water collected in CWC #1078 from the Lab CCAA (Common Cabin Air Assembly) dehumidifier. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables, and today also the periodic (~monthly) checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

Kotov did the IMS (Inventory Management System) updating today, editing its standard “delta file” for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-1, FE-2), TVIS treadmill (CDR), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later, Kotov copied the crew’s exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

As a recurring item on the Russian voluntary task list, Fyodor and Oleg were asked to perform an equipment audit in the Russian segment (RS) of the ISS, today behind stowage panels in the FGB, supported by an uplinked comprehensive list.

A second discretionary-choice task for Yurchikhin and Kotov was to take photo/

video footage of the RS modules' interiors.

Today's CEO (Crew Earth Observation) photo targets were **PMC (Polar Mesospheric Clouds)** (*PMC, also known as noctilucent clouds*), are being studied as part of the International Polar Year (IPY) investigation of climate change in high latitudes. Summer is high season for viewing. PMC form in the stratosphere and higher, i.e. well above the lowest layer of the atmosphere (troposphere, or weather layer, characterized by clouds, and an orange tinge produced by brushfire smoke, smog, etc.). The AIM satellite (Aeronomy of Ice in the Atmosphere) has just been launched to investigate how PMC form and why they are apparently becoming thicker and brighter. ISS CEO imagery will complement images from AIM and from the ground. The collaborating IPY scientist "is excited to receive any images the crew may acquire". PMC are best observed from the night side of the terminator (sun angles 35-10 degrees below the horizon), but looking toward the terminator, i. e. generally poleward (left), starting ~32 N).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (*all dates Eastern and subject to change*):

08/02/07 -- Progress M-61/26P launch

08/05/07 -- Progress M-61/26P docking (DC1 nadir)

08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)

08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)

08/21/07 -- STS-118/Endeavour/13A.1 landing

08/??/07 -- SSRMS setup for viewing PMA-3 relocation

08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]

09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1) & reentry

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)

10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing

10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks [*under review*]

10/20/07 -- (NET) STS-120/Discovery/10A docking

10/22/07 -- (NET) Node 2 relocation

10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/31/07  
**Date:** Tuesday, July 31, 2007 1:57:45 PM  
**Attachments:**

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**ISS On-Orbit Status 07/31/07**

All ISS systems continue to function nominally, except those noted previously or below. *Closeout day for Progress M-59/24P. **24P undocking tomorrow: 10.04am EDT.***

Before breakfast, CDR Yurchikhin and FE-1 Kotov completed another session with the Russian crew health-monitoring program's medical assessment MO-9/ Biochemical Urinalysis, then stowed the Urolux equipment. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

FE-2 Anderson had 1.5 hrs reserved for cleaning filters on the U.S. CDRA (Carbon Dioxide Removal Assembly).

Afterwards, Anderson connected the ITCS LTL (Internal Thermal Control, System/ Low Temperature Loop) cooling line QD (Quick Disconnect), and then reconfigured the Lab CCAA (Common Cabin Air Assembly) air conditioner, switching it from one channel to the alternate system on the other cabin side. *[The CCAA is a network of ducting that draws in the air through filters, delivers it for conditioning, and returns it to the modules. The swap-over between the CCAA channels is generally done by the crew once a month, with ground support, to dry out the heat exchanger of the deactivated side. MCC-H commands the required systems configurations for the dryout via S-band.]*

Kotov collected the periodic ISS cabin air readings with the Russian GANK-4M Real-

Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

The FE-1 also conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables. Today, Oleg added a teleconference with TsUP/Moscow specialists to discuss uplinked questions regarding the GZhS air/liquid separator of the water transfer system. *[Topics included the observed presence of fine-dispersed (slush-like, foam-like) substance inside the separator during this Expedition, amount of air formed after initial separation and settling-out in filled EDV, time after start of separation when the most intensive air escape from separated water can be observed, etc.]*

The CDR updated the IMS (Inventory Management System), editing its standard “delta file” for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Oleg and Fyodor finished stowing disposed hardware in Progress M-59/24P, keeping track of the moves and changes in the IMS.

Afterwards, the CDR formally reported stowage completion to TsUP via S-band, and the FE-1 powered down the ham radio equipment in SM (Service Module) and FGB (Funktsionalnyi-Grusovoi Blok) at ~9:35am to prevent RF interference with the departing spacecraft.

In preparation of tomorrow’s Progress separation, Yurchikhin activated the cargo ship and dismantled the ventilation air duct between 24P and the DC1 Docking Compartment, stowing the duct and its air heater & fan assembly in the DC1.

During subsequent removal of the threaded quick-disconnect (QD) screw clamps of the docking & internal transfer system (SSVP), which had rigidized the mating surfaces, followed by closure of the hatches between 24P and transfer tunnel (~10:50am EDT), and the standard one-hour DC1-SU & SU-Progress vestibule leak check to verify hermeticity, the ground restricted thruster firings by the Russian segment (RS) in the time interval 10:20am–12:10pm.

Later, at ~10:40am, Fyodor downlinked the video footage taken of the Progress/DC1 docking interface before hatch closing, via Ku- and S-band, for ground inspection.

For the Progress propulsion system, the ground, by remote command, connected the spherical prop delivery tanks and the prop tanks of the KDU Combined Propulsion System.

In preparation for the 13A.1 EVAs, Clay Anderson took photo/video footage of the internal arrangements of the U.S. Airlock.

Clay also unstowed & set up the hardware for his third session with the NUTRITION experiment, which begins tomorrow with a blood draw and urine collection part, requiring Clay to forego exercising and food intake for eight hours, i.e., starting tonight. *[The 24-hour sample collection starts with the first void tomorrow morning and continues through the first void Saturday morning. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts, collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing in-flight samples (plus an additional postflight sample), made possible by the MELFI/Minus Eighty Degree Celsius Laboratory Freezer for ISS.]*

After reviewing the latest 13A.1/STS-118 cargo transfer list and conducting a review of the current crew timeline for the 13A.1 docked period, the crew discussed these topics with the ground in two audio/S-band teleconferences.

At ~8:00am, the two Russian crewmembers held a PAO/TV conference with a correspondent from Rossiysky Kosmos (Russian Space) magazine, answering questions for an article to be published in the magazine's September issue which supports celebrations of the 150<sup>th</sup> birthday of K. E. Tsiolkovsky.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO cycle with bungee cord load trainer (FE-1).

Later, Kotov copied the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*Saturday Science Update:* A list of two suggested activities for the voluntary "Saturday Science" program on 8/4 was uplinked for Clay's choice. His selection is required by tonight. *[The two choices are (1) a new run of SWAB (Surface, Water and Air Biocharacterization), and (2) CFE VG1 (Capillary Flow Experiment – Vane Gap 1). SWAB is a comprehensive characterization of microorganisms and allergens in spacecraft. It uses advanced molecular techniques to comprehensively evaluate microbes on board the space station, including pathogens. It also tracks changes in the microbial community as spacecraft visit the station and new station*

*modules are added. This study allows an assessment of the risk of microbes to the crew and the spacecraft. CFE VG1 would continue the detailed mapping of the container, targeting the third quadrant of the vessel for steady state fluid shapes at vane positions around each of the critical wetting angles for the large gap and small gap. The investigation of the sensitivity to asymmetry will also be continued again targeting the third quadrant. Note: this would complete the CFE-VG1 experiment.]*

As a recurring item on the Russian voluntary task list, Fyodor and Oleg were asked to perform an equipment audit in the Russian segment (RS) of the ISS, today in the FGB, supported by an uplinked comprehensive list.

A second discretionary-choice task for Yurchikhin and Kotov was to take photo/video footage of the RS modules' interiors.

As a third "time permitting" job, Oleg was to conduct the periodic status check on the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G growth payload, performing a health check on the fans of the BO/V control box (verifying all-green LEDs) and Lada-10/MIS (Module for the Investigation of Substrates) greenhouse, using the hand to check for air flow of three control box fans and six fans of MID-LADA module.

Last night's O<sub>2</sub> (oxygen) repress of the ISS cabin atmosphere from 24P stores emptied the 24P tanks.

Today's CEO (Crew Earth Observation) photo targets were **PMC (Polar Mesospheric Clouds), Northern Hemisphere** (*PMC, also known as noctilucent clouds*), are being studied as part of the International Polar Year (IPY) investigation of climate change in high latitudes. Summer is high season for viewing. PMC form in the stratosphere and higher, i.e. well above the lowest layer of the atmosphere (troposphere, or weather layer, characterized by clouds, and an orange tinge produced by brushfire smoke, smog, etc.). The AIM satellite (Aeronomy of Ice in the Atmosphere) has just been launched to investigate how PMC form and why they are apparently becoming thicker and brighter. ISS CEO imagery will complement images from AIM and from the ground. The collaborating IPY scientist "is excited to receive any images the crew may acquire". PMC are best observed from the night side of the terminator (sun angles 35-10 degrees below the horizon), but looking toward the terminator, i.e. generally poleward (left, starting ~32 N), and **High Central Andean Glaciers** (*many volcanoes in the high Andes have ice fields, and dramatic melting has been observed in some ice fields. Looking nadir and left, and then nadir and right as ISS crosses the mountain chain. The ice fields are best developed along the east side of the Andes where rainfall from Amazon air masses is heaviest*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (*all dates Eastern and subject to change*):

08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry  
08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 “Harmony”, racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 “Jules Verne” launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking

02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
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04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/30/07  
**Date:** Monday, July 30, 2007 7:33:06 PM  
**Attachments:**

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### **ISS On-Orbit Status 07/30/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 15 of Increment 15.*

In preparation for the arrival of Progress 26P on 8/5, the crew successfully conducted the standard 3-hr. training course on the TORU teleoperated control system. *[The drill involved a review of procedures and docking/math model data, UHF/S-band tagup with a ground instructor, and onboard training on a special TORU simulation program with video on laptop computer TP2. Flown on the simulator were all phases of rendezvous, flyaround, final approach and docking, plus off-nominal situations like no comm in the SM-to-26P or 26P-to-SM channels, loss of TV feed, display format hang-up on the SM's Simvol-TS screen, and docking failure of TORU before capture. During Kurs-controlled rendezvous, the TORU is in "hot standby" mode, and it would allow Yurchikhin to perform necessary guidance functions manually from the SM via two hand controllers in the event of a failure of the "Kurs" automated rendezvous and docking (AR&D) of the Progress. Should the docking attempt fail, the cargo ship's motions would be controlled by the crewmember from a console by viewing the approach to the ISS on the Simvol-TS screen as seen by the Klest-M television camera mounted on the Progress, followed by stationkeeping at 30m. Final approach should then be initiated not earlier than 3:20pm to ensure RGS coverage, important for situational awareness, although remote TORU control from the ground is not available at this point. Nominal docking will be outside RGS (Russian ground site) coverage.]*

Yurchikhin and Kotov installed the docking mechanism (StM, *Stykovochnovo mekhanizma*) between 24P and the DC1, to prepare for the cargo ship's undocking on 8/1.

Afterwards, the crew transferred cargo destined for disposal to the 24P.

Floating in the Progress ship, CDR Yurchikhin dismantled and removed the LKT local temperature sensor commutator/switch (TA251MB) of the BITS2-12 onboard telemetry system, along with its PZU-1M ROM (read-only memory) unit. *[The avionics items were stowed on ISS for reuse in a future vehicle.]*

At ~6:35am EDT, the crew tagged up with MCC-Houston via S-band/audio to discuss CDRA (Carbon Dioxide Removal Assembly) operations.

The CDR conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Later, Fyodor also did the IMS (Inventory Management System) updating today, editing its standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

FE-2 Anderson meanwhile continued hardware prepacking ops for return on Shuttle flight 13A.1/STS-118. *[Ground to Crew: "We hope all of your weekend work on the Prepack List keeps you ahead of the timeline for the rest of the week."]*

Anderson had another hour reserved for reviewing the preliminary 13A.1 EVA timelines.

FE-1 Kotov performed the periodic collection and downlinking of data of the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse.

Oleg also readied the equipment for the Russian "Urolux" biochemical urine testing (PZE MO-9), scheduled for tomorrow. *[MO-9 is conducted regularly every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for US crewmembers for IMG (Integrated Medical Group) PHS evaluation as part of the "PFE w/o Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. The data are then entered in the Medical Equipment Computer (MEC)'s special IFEP (In-Flight Examination Program) software.]*

Afterwards, Yurchikhin took the periodic (generally monthly) health test with the cardiological experiment PZEH MO-1 "Study of the Bioelectric Activity of the Heart at Rest" on the TVIS (Treadmill with Vibration Isolation System), assisted by Kotov. *[During the 30-min. test, the crew tagged up with ground specialists on Russian ground site (RGS) passes via VHF (~5:02am EDT) and downlinked data from the Gamma-1M ECG (electrocardiograph) for about 5-6 minutes.]*

Clay Anderson worked on the RED (Resistive Exercise Device), replacing two canister pulley cables (done after every 53,515 cycles, based on life cycle testing results & safety controls), afterwards concluding with the standard Flexpac canister load calibration as required after cable replacements. (Last time done: 5/7). *[The replaced cord cables had approximately 41,670 cycles and would have exceeded the standard limit if replaced at the next timeline opportunity. Clay's on-orbit calibration of the Schwinn RED cans re-established the relationship of specific load settings with a specific number of pulls per setting, followed by recording of the load values measured with a calibration tool and steel handles from the on-orbit calibration kit.]*

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-1), TVIS treadmill (CDR/MO-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO cycle with bungee cord load trainer (FE-1).

Later, Anderson copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

As a recurring item on the Russian voluntary task list, Fyodor and Oleg were asked to perform an equipment audit in the Russian segment (RS) of the ISS.

A 12 mmHg O<sub>2</sub> (oxygen) repress of the ISS cabin atmosphere from 24P stores was completed. Tomorrow's O<sub>2</sub> repress will be the last one, depleting 24P tanks.

*MT Update:* The Mobile Transporter move to WS-1 (Work Station 1) was successfully completed. MT is now in 13A.1 configuration.

*JAL GLA Update:* A GLA light fixture (General Luminaire Assembly) in the Joint Airlock needs replacement. Specialists are checking whether it will be needed for 13A.1.

*EWIS NCU Update:* The damaged EWIS NCU (External Wireless Instrumentation System/Network Control Unit) was reported repaired and is ready for shipment to the ISS on STS-118.

No CEO (Crew Earth Observation) photo targets uplinked for today.

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are

downloaded by the public each month from this “Gateway” site);  
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08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
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10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 “Harmony”, racks  
[*under review*]  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
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12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch [*to be reviewed*]  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
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02/??/08 -- Russian EVA-20 [*to be reviewed*]  
02/12/08 -- Progress M-63/28P launch [*to be reviewed*]  
02/14/08 -- Progress M-63/28P docking  
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04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/29/07  
**Date:** Sunday, July 29, 2007 12:31:10 PM  
**Attachments:**

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### **ISS On-Orbit Status 07/29/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Clay Anderson). FCT (Flight Control Team) to crew: “Today looks like a real day off.” Ahead: Week 15 of Increment 15.*

CDR Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Oleg also gathered data on total operating time & “On” durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM’s SOGS air revitalization subsystem for reporting to TsUP.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Each crewmember had their weekly PFC (Private Family Conference), Fyodor at ~6:30am EDT, Oleg at ~7:40am, Clay at ~3:35pm.

Working off the Russian voluntary task list, the CDR conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature.

*[Today’s Uragan photo targets were Peru, the Andes, the Huascarán volcano, Patagonia ice field, and the Waddell Sea.]*

A new discretionary task for Oleg Kotov was another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Japanese HDV video camera to obtain imagery of the bio-luminescent glow of high production zones from SM window #7.

A second discretionary task list item for the FE-1 Oleg Kotov was the periodic check of the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the MATRYOSHKA-R payload in the DC1 Docking Compartment. *[The reader automatically records radiation readings at strictly defined times (:00, :15, :30, :45 minutes). The complex Matryoshka payload suite is designed for sophisticated radiation studies. The payload collects radiation measurements every 15 minutes of each hour around the clock.]*

Oleg also performed the periodic status check of the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse.

No CEO (Crew Earth Observation) photo targets uplinked for today.

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08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
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08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing

10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
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12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-  
PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/28/07  
**Date:** Saturday, July 28, 2007 8:50:09 PM  
**Attachments:**

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### **ISS On-Orbit Status 07/28/07**

All ISS systems continue to function nominally, except those noted previously or below.

The crew conducted the regular weekly three-hour task of thorough station cleaning. [*"Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.*]

As part of the house cleaning, Fyodor and Oleg performed preventive maintenance cleaning on SM fans & grilles VPhO, VdPrK, VPrK, and on the V3 ventilator grill in the DC1 (Docking Compartment). They also serviced the four PF1-4 dust filters in the SM by changing out their cartridges.

At ~8:50am EDT, the crew members held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

FE-2 Anderson disconnected, later reconnected the portable microphone of the integrated voice communications system.

After lunch (~9:25am), Clay filled out the regular FFQ (Food Frequency Questionnaire), his fifth, on the MEC (Medical Equipment Computer). [*By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads,*

*snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

CDR Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables, while Kotov performed the periodic (~monthly) checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

The crew conducted a review of the preliminary 13A.1 EVA timeline and held a teleconference with ground specialists via S-band at ~12:10pm.

In the Airlock, Anderson terminated EVA battery charging in the BSA (Battery Stowage Assembly).

Over RGS (Russian Ground Stations) and controlled by the SPP onboard sequencer, FE-1 Kotov supported the downlinking of the Progress 25P docking video by the LIV television system which he tested yesterday for this purpose.

Later, Clay disconnected the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable at the Cupola and Lab RWS (Robotics Work Station).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later, Clay copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off the Russian voluntary task list, the CDR conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature.

*[Today's Uragan photo targets were the Patagonia ice field, the Waddell Sea, and icebergs.]*

A second discretionary task for Fyodor was photography of the SKK Removable Cassette Container payload, cassettes #1 & #9.

Oleg Kotov had another data monitoring and calldown session with the

MATRYOSHKAR radiation payload and its Lulin-5 electronics box.

Oleg also made ECON earth observations and took photography.

### **Weekly Science Update** (*Expedition Fifteen -- 14<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Shielding tile removal and ALTEINO rotation were performed on 7/17. The data file was downlinked on 7/18 and file size was reported by the crew. The file size is smaller than expected. Science team will assess upon receipt of the data / photos

*ANITA:* Planned.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2:* Continuing.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS):* Continuing,

*CFE (Capillary Flow Experiment):* Reserve.

*CHROMOSOME-2 (E14 SFP):* Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* Powered off. Waiting to support other experiments such as BCAT.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* Powered off. Contains CSI-01, awaiting return home on 13A.1.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Next scheduled operation is 10/29-11/3.

*EMCH (Elastic Memory Composite Hinge):* Complete.

*EPO (Educational Payload Operation) Kit C:* Planned.

*IMMUNO (Saliva Sampling):* First session started on 7/25. Blood samples (7/26) and urine samples (7/27) were inserted into MELFI. No problems reported. Session completed on 7/27.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* Planned

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* Planned.

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION:* Planned.

*SAMPLE:* Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* "Thanks very much for finishing your second week of sleep logs - your participation is much appreciated."

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 7/21 the ground has received a total of 8.666 CEO images for review and cataloging for Increment 15. "We just received your photos of: Etna Volcano, Florida Coastal Everglades, Tropical Storm Cosme, Tigris-Euphrates Delta, and Lake Nasser-Toshka Lakes. We will be providing feedback on these as we catalog them in the coming days. A beautifully detailed view of Brooklyn, NY, acquired earlier in Expedition 15 will be published on NASA/GSFC's Earth Observatory website this weekend. A sharp 800mm view nicely illustrates the dense, urban fabric of that area with both color and clear detail. Kudos to the crew!"

Today's CEO (Crew Earth Observation) photo targets were **Kerguelen Is., South Indian Ocean** (*this glaciated and volcanic archipelago is located in the far south Indian Ocean nearly 2,000 miles SE of the island of Madagascar. Of primary interest is photography for monitoring of the rarely photographed ice field and glaciers located on the western end of the main island. The opportunity exists to see the site between cloud masses. Looking left of track for the largest island and its small ice sheet*), **A22A iceberg, South Atlantic Ocean** (*Since the last low-earth-orbit opportunities for imaging, this major iceberg in the central south Atlantic has broken into two parts. Today's report is that numerous fragments surround the main bergs. Prior crews report that large icebergs stand out well compared with surrounding cloud as being bluer and smooth in texture. There are cloud masses in the area but the crew had a chance to image the A22A. Looking to nadir and a touch left*), and **Patagonian Glaciers** (*looking left of track, on the east side of the Andes where there are less clouds, and shoot any small glacier tongues you see. The large glaciers have been successfully imaged. The general trend for the last two decades has been for most glaciers that flow off the two Patagonian ice sheets to become thinner due to warming in the region*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

### **Significant Events Ahead** (*all dates Eastern and subject to change*):

- 08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry
- 08/02/07 -- Progress M-61/26P launch
- 08/05/07 -- Progress M-61/26P docking (DC1 nadir)
- 08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3
- 08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)
- 08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)
- 08/21/07 -- STS-118/Endeavour/13A.1 landing
- 08/??/07 -- SSRMS setup for viewing PMA-3 relocation
- 08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)
- 08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]
- 09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)
- 10/01/07 -- Progress M-61/26P undocking (DC1) & reentry
- 10/02/07 -- Soyuz TMA-11/15S launch
- 10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)
- 10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing

10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-  
PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/27/07  
**Date:** Friday, July 27, 2007 8:17:50 PM  
**Attachments:**

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### **ISS On-Orbit Status 07/27/07**

All ISS systems continue to function nominally, except those noted previously or below.

The three crewmembers performed the Russian biomedical routine assessments of PZeh-MO-7/Calf Volume Measurement and PZeh-MO-8/Body Mass Measurement (sixth time for CDR & FE-1, third for FE-2), using the IM mass measurement device which Oleg Kotov afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference pints, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

CDR Yurchikhin also finished Part 2 of his first stress test plus saliva and blood sampling of the ESA/Russian biomed experiment "IMMUNO", today completing remaining urine sample collections. Specimens were then stowed in a special urine containment bag (blood samples were secured yesterday in the MELFI {Minus Eighty Degree Celsius Laboratory Freezer for ISS} in cold packs). *[IMMUNO is a 24-hr. test of human immune system changes, with the objective to investigate immune neuro-endocrine reactions in the space environment by studying samples of saliva, blood and urine using collection kits and the biomedical (MBI) protection kit. Also included are entries in a fluid/medications intact log, and a stress-test questionnaire to be filled out by the subject at begin and end of the first day.]*

It was CDR Yurchikhin's turn today on the Russian PNEVMOKARD experiment,

performing his third session (which forbids moving or talking during data recording). FE-1 Kotov performed it on 7/17. The experiment is controlled from the RSE-Med A31p laptop, equipped with new software, and uses the TENSOPPLUS sphygmomanometer to measure arterial blood pressure. *[PNEVMOKARD (Pneumocard) purports to obtain new scientific information to refine the understanding about the mechanisms used by the cardiorespiratory system and the whole body organism to spaceflight conditions. This is an integrated study of a cardiovascular system of crewmembers in various phases of a long-duration mission in order to clarify the adaptation mechanisms and phases and determine diagnostic criteria for individual assessment of the organism adaptation to zero-gravity conditions. By recording (on PCMCIA cards) the crewmember's electrocardiogram, impedance cardiogram, low-frequency phonocardiogram (seismocardiogram), pneumotachogram (using nose temperature sensors), and finger photoplethysmogram, the experiment supports integrated studies of (1) the cardiovascular system and its adaptation mechanisms in various phases of a long-duration mission, (2) the synchronization of heart activity and breathing factors, as well as the cardiorespiratory system control processes based on the variability rate of physiological parameters, and (3) the interconnection between the cardiorespiratory system during a long-duration mission and the tolerance of orthostatic & physical activities at the beginning of readaptation for predicting possible reactions of the crewmembers organism during the their return to ground.]*

After ground testing yesterday confirmed the NVM-2 Navigation Computer Module of the ASN Satellite Navigation Equipment to be failed, Yurchikhin today replaced the NVM-2 with a spare unit and reconfigured the system for nominal ops.

Meanwhile, in preparation of next week's (8/1) undocking of Progress M-59/24P, FE-1 Kotov unbolted and removed the cargo ship's US-21 matching unit in its container box. *[The BITS 2-12 onboard telemetry measurement system and VD-SU monitoring mode, turned off for the activity, were later reactivated. The US-21, with its associated commutator gear, provides the electronic interface between the Service Module (SM) and the Progress for SM computer control of Progress propulsion. When a Progress is undocked and jettisoned, the valuable electronics are retained in storage, to be recycled on a future vehicle.]*

FE-1 Kotov gathered and stowed hardware to be jettisoned in Progress 24P. FE-2 Anderson had another 2 hrs set aside for prepacking 13A.1 return cargo and transferring it to the staging location in the Node.

Anderson also set up video equipment at the ALTEA (Anomalous Long Term Effects on Astronauts) hardware and took situational video for documentary purposes of the dosimeter setup. Clay then performed the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking

the status of dosimeter LEDs (light emitting diodes) and downloading accumulated data for analysis before stowing the hardware. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Continuing the current round of the monthly preventive maintenance of RS ventilation systems, Kotov today took on the preventive maintenance on the ventilation system in the DC1 (Docking Compartment) by cleaning its & VD2 air ducts.

Oleg serviced the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse, collecting measurement reading for downlink, conducting the periodic documentary photography and filling the KDV water tank from the spare KOV-EDV container.

The FE-1 also performed the weekly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), checking the condition of the roller bearings and record its time & date values.

Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables, while Kotov performed the periodic (~monthly) checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

Oleg also did the IMS (Inventory Management System) updating today, editing its standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

After the IMMUNO urine sampling was done, Fyodor conducted the periodic sampling of cabin air for subsequent analysis on the ground, employing the IPD-CO Draeger tubes sampler to check for NH<sub>3</sub> (Ammonia) in the SM.

Clay completed the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit).

Batteries were to be replaced if necessary. *[Purpose of the 10-min. activity is to correlate the hand-held readings with MCA (Major Constituents Analyzer) measurements. Two CSA-CP (CSA-Combustion Products) instruments recorded O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post (#1057, prime) and in the Node (#1060, backup), while the CSA-O<sub>2</sub> units (#1056, #1059) looked for O<sub>2</sub> in the*

*Lab and the CDMK (#1007) for CO<sub>2</sub> in SM and Lab. Also recorded were battery ticks. The instruments were turned off afterwards, except for the prime CSA-CP #1057 unit, and returned to their regular locations.]*

The FE-2 also performed the regular bi-weekly maintenance reboots of the SSC (Station Support Computer) File Server and OCA Comm Router laptops.

Anderson also had another 1:15 hrs reserved for configuring EVA tools in the Airlock for the upcoming 13A.1 spacewalks.

Early in the morning, the ground performed an MT (Mobile Transporter) translation. During the translation, RS thrusters were inhibited at 3:55am EDT and re-enabled at 12:10pm after the MT Translation. At 12:25pm, ISS transitioned to Russian thruster control for the Progress 24P propellant purge, executed at 2:45pm.

Clay configured and prepared an ER4 (EXPRESS rack 4) locker for the ANITA experiment payload.

At ~3:45am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow. *[Point of discussion was the crew's desire for GOGU to schedule back-up activities which can be executed in the crew's spare time.]*

At ~5:05am, Fyodor and Oleg linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations.

At~9:25am, Kotov conducted a test session over RGS (Russian ground site) to check downlink video transmission from the Russian LIV television system commanded from the SPP onboard program sequencer.

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio was timelined later at ~4:10pm.

At ~4:50pm, the station crew held a teleconference with the Expedition 16 crew via Ku- & S-and, for early "handover" purposes.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later, Oleg copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

**Significant Events Ahead** (*all dates Eastern and subject to change*):

08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry  
08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking

02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/26/07  
**Date:** Thursday, July 26, 2007 8:41:26 PM  
**Attachments:**

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**ISS On-Orbit Status 07/26/07**

All ISS systems continue to function nominally, except those noted previously or below.

CDR Yurchikhin's activities today were dominated by his first stress test plus saliva, urine and blood sampling of the ESA/Russian biomed experiment "IMMUNO". He was assisted by FE-1 Kotov where required for venous blood collection and blood sample processing (smear and in the Plasma-03 centrifuge). *[The sequence is run twice during the day. Samples are secured in the MELFI (Minus Eighty Degree Celsius Laboratory Freezer for ISS) in cold packs in their KB-03 container, and the CDR will also tape a video of the MELFI stowage to help the ground team to develop better packing plans for samples to be returned. IMMUNO is a 24-hr. test of human immune system changes, with the objective to investigate immune neuro-endocrine reactions in the space environment by studying samples of saliva, blood and urine using collection kits and the biomedical (MBI) protection kit. Also included are entries in a fluid/medications intact log, and a stress-test questionnaire to be filled out by the subject at begin and end. As per Flight Rule, the invasive (blood drawing) event is timed to be at a thruster-inhibited period.]*

After the regenerable two-channel Vozdukh CO<sub>2</sub> scrubber ran in Mode 1 (automatic cycle switching control) since yesterday, the CDR today switched it back to Mode 5 (manual control).

The FE-1 meanwhile disassembled an electromagnetic valve on the BPK Condensate Feed Unit (CFU) for repair. *[The BPK electric condensate pumping unit is used for the regular processing ("regenerating") of KAV condensate water in the Russian water processing system (SRV-K2M).]*

Fyodor completed the periodic checkup/servicing of the ALTCRISS (Alteino Long

Term monitoring of Cosmic Rays on the ISS) AST spectrometer data by removing its PCMCIA memory card (#931) for checking its contents. *[The PCMCIA was re-inserted in the AST. The ALTCRISS spectrometer/dosimeter provides long-term records of space radiation in the SM.]*

Continuing the current round of the monthly preventive maintenance of RS ventilation systems, Yurchikhin cleaned the Group A fan grilles in the Service Module (SM), including the VPrK and VPkhO ventilator screens in the aft end. *[Quite frequently lost items can be found by checking out these ventilation screens.]*

Oleg performed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The FE-1 also updated/edited the standard daily IMS (Inventory Management System) "delta" file which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Continuing the software upgrade in the RS, Kotov removed Laptop 2 and installed Laptop 3 (LT3) to support the subsequent installation of software upgrade 7.05 on LT3. Later, Laptop-3 was removed and Laptop-2 installed at a designated location.

FE-2 Anderson conducted the weekly 10-min CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

For the subsequent 2.5 hrs of SSRMS (Space Station Remote Manipulator System) operations from the Lab RWS (Robotic Workstation), Clay closed the protective Lab window shutters, started the updated POC DOUG (*Portable Onboard Computer/Dynamic Operations Ubiquitous Graphics*) software application and conducted an operations review using the DOUG software.

In the Airlock (A/L), Anderson terminated the charging of EMU batteries in the BSA (Battery Stowage Assembly) and started the charging process on the second set. The FE-2 also shut down the METOX (Metal Oxide" regeneration in the A/L.

Yurchikhin worked on the R&R (removal & replacement) of a manual shutoff valve in the SM Rodnik tank panel.

After ground-based testing of the NVM-2 Navigation Computer Module of the ASN Satellite Navigation Equipment using new software (vers. 01.06), additional NVM-2

test data are today being transferred to Flash card.

In preparation for Progress M-61/26P arrival on 8/5, Yurchikhin and Kotov supported a ground-controlled functions test of the SM and Progress TORU telemanipulator system without Progress DPO thrusters firing. *[The TORU teleoperator system provides a manual backup mode to the Progress' KURS automated rendezvous radar system. The two crewmembers will be monitoring the approach and docking of Progress M-61 at the DC1 from the TORU station in the SM.]*

FE-1 Kotov collected the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Clay deactivated the OGS (Oxygen Generator System) in the Lab. *[During today's OGS Deactivation Support, the N<sub>2</sub> Purge ORU is disconnected from the O<sub>2</sub> Outlet ORU by disconnecting a single QD (quick disconnect). Per flight rules, this activity is required within 14 days following OGS deactivation in order to prevent gas migration within the OGA. During 13A.1, the OGS PWR (Payload Water Reservoir) will be refilled on the Shuttle then reconnected to the WDS (Water Delivery System). The WDS was activated to refill the accumulator tank and then the OGS PWR was refilled to leave ISS with as much water as possible for the next OGS activation. The procedures and plans have been written so that no equipment needed for this activity will be stowed inside the OGS rack. The date of the next activation is still TBD. The tentative plans are to activate OGS approximately every 90 days, but these details are still being worked.]*

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Clay will copy the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

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08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch

04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/25/07  
**Date:** Wednesday, July 25, 2007 8:57:03 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 07/25/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-2 Anderson continued his current SLEEP experiment by accessing the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

After the regenerable two-channel Vozdukh CO<sub>2</sub> scrubber ran in Mode 5 (manual control) since 7/19, CDR Yurchikhin today switched it back to Mode 1 (automatic cycle switching control).

FE-1 Kotov assisted in the reactivation of the Elektron O<sub>2</sub> generator at 32 amps, monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Working in the Airlock (A/L) on more post-EVA cleanup tasks, Yurchikhin set up and started the periodic scrubbing process on the EMUs' (Extravehicular Mobility Units) cooling water loop, by initiating its ionic and particulate filtration, then reconfigured the cooling loops, disassembled and stowed the EVA tools, and installed the first, later the second METOX (Metal Oxide) canister in the oven for regeneration. Afterwards, the EMU water processing kit was stowed. *[Purpose of the scrubbing,*

*including iodination of the LCVGs (Liquid Cooling & Ventilation Garments) for biocidal maintenance, is the elimination of any biomass and particulate matter that may have accumulated in the loops.]*

Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Oleg also did the IMS (Inventory Management System) updating today, editing its standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

In the Service Module (SM), Yurchikhin powered down the BSV-M1 and BSV-M2 Time Synchronization Units and modified/re-mated cable connectors. BSV-M1 was then powered up again.

The FE-1 had one hour set aside for inventorying and repacking/consolidating CMS (Counter Measure Systems/AOK) kits and accessories.

FE-2 Anderson completed another 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, using his DCS-760 digital still camera with 400 & 800mm lenses at SM windows 6 & 8 to take imagery of documented CEO Earth targets using manual focusing only. Later (~10:00am EDT), Clay downlinked the obtained OBT images to the ground for analysis. The skill training prepares the crew for the bottom side mapping of the Orbiter at the arrival of STS-118/13A.1. *[During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Endeavour, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

The FE-2 updated/revised the C&W (Caution & Warning) book with new uplinked material.

For his upcoming first session of the ESA/Russian biomed experiment "IMMUNO", Fyodor Yurchikhin set up the IMMUNO urine collection hardware and took air samples with the IPD-NH<sub>3</sub> Draeger tubes sampler, testing for ammonia (NH<sub>3</sub>) in the SM. *[IMMUNO is a 24-hr. test of human immune system changes, with the objective to investigate immune neuro-endocrine reactions in the space environment by studying samples of saliva, blood and urine using collection kits and the biomedical (MBI) protection kit. Also included are entries in a fluid/medications intact log, and a stress-test questionnaire to be filled out by the subject at begin and*

*end.]*

At ~7:45am EDT, FE-2 Anderson used the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) to hold a ham session with students at Challenger Learning Center of Lucas County, Oregon, Ohio.

At ~8:00am, the crew conducted a teleconference with the Shuttle crew of STS-118/13A.1 via Ku- & S-band.

A discretionary crew TV conference was held by Clay at ~10:50am.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Clay will copy the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Later, Clay copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

TsUP/Moscow conducted KURS tests on the DC1 side (two strings), in preparation for the Progress M-61/26P docking.

**Significant Events Ahead** (*all dates Eastern and subject to change*):

- 08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry
- 08/02/07 -- Progress M-61/26P launch
- 08/05/07 -- Progress M-61/26P docking (DC1 nadir)
- 08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3
- 08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)
- 08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)
- 08/21/07 -- STS-118/Endeavour/13A.1 landing
- 08/??/07 -- SSRMS setup for viewing PMA-3 relocation
- 08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)
- 08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*
- 09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)
- 10/01/07 -- Progress M-61/26P undocking (DC1) & reentry

10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/24/07  
**Date:** Tuesday, July 24, 2007 6:33:38 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

ISS On-Orbit Status 07/24/07

All ISS systems continue to function nominally, except those noted previously or below.

FE-2 Anderson continued his current SLEEP experiment by accessing the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

After wakeup, before breakfast & first exercise, CDR Fyodor Yurchikhin and Clay Anderson completed the post-EVA session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. Fyodor later stowed the Urolux hardware. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

As standard post-EVA health status checkup, Anderson and Yurchikhin also took the general U.S. PFE (Periodic Fitness Evaluation), a 20-min procedure to check up on general crewmember health after the spacewalk. *[Cardiovascular readings were logged on the MEC's IFEP software. Later, Fyodor and Clay also linked up with the ground via Ku- and S-band with NetMeeting/video for the usual private post-EVA medical conference (PMC).]*

FE-1 Kotov recorded the post-EVA radiation readings from the EMU-worn plus background "Pille-MKS" dosimeters and transferring the sensors to their regular sites. He also retrieved the ID-3 personal dosimeter from Yurchikhin's EMU LCVG (Liquid Cooling & Ventilation Garment) and re-attached it on the CDR's flight outfit for constant wear;

The FE-1 performed the periodic O<sub>2</sub> sensor adjustment on the Russian IK0501 gas analyzer, with tagup support provided by ground specialists as necessary.

*[IK0501 is an automated system for measuring CO<sub>2</sub>, O<sub>2</sub>, and H<sub>2</sub>O in the air as well as the flow rate of the gas being analyzed.]*

At ~8:55am EDT, the crew held the standard post-EVA debriefing with ground specialists at MCC-H.

The two spacewalkers worked in the A/L, preparing the EMU PWR (Extravehicular Mobility Unit Payload Water Reservoir), degassing the suits, refilling the EMU water tanks, initiating the recharge of the depleted EVA batteries in the BSA (Battery Stowage Assembly), starting the regeneration of the METOX (Metal Oxide) CO<sub>2</sub> absorption canisters, and reconfiguring the A/L to pre-EVA condition.

Clay also disconnected the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable at the Cupola and Lab RWS (Robotics Work Station), which was used for video coverage during the spacewalk.

Oleg Kotov serviced the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G growth payload, by collecting and downlinking data via diskette. *[Rasteniya researches growth and development of plants under spaceflight conditions in the Lada-10 greenhouse. The regular maintenance of the experiment (generally each Monday, Wednesday, Friday and Sunday) involves monitoring of seedling growth, humidity measurements, moistening of the substrate if necessary, topping off the water tank if ~20-25% of the total amount (4 liters) remains, and photo/video recording. Once weekly, data from the Lada greenhouse control unit are recorded on floppy disk for weekly downlink via REGUL-Packet or the new BSR-TM at a suitable occasion. Experiment purpose is the study of (1) plants cultivation technology, (2) the impact of space flight factors on the growth and evolution of plants which can be potentially used in space vitamin greenhouses, (3) germination & viability of plants, (4) reproductive properties of plants, and production of the second generation of space seeds, (5) chemical composition of plants and seeds grown in zero-g conditions to define the content of nitrocompounds in vegetable biomass, etc.]*

In addition, Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU

toilet facilities systems/replaceables.

CDR Yurchikhin had an hour reserved for uploading a diagnostic software patch to the NVM-2 Navigation Computer Module of the ASN Satellite Navigation Equipment using new software (vers. 01.06). The purpose of the software patch is to collect data while the NVM-2 is operating. The data collection is to help determine why the module did not perform as expected when it was tested on 7/21.

Anderson had a US VHF Proficiency Pass scheduled this afternoon using the Dryden VHF Site. *[Purpose of the test was to verify signal reception and link integrity, and to ensure minimum required link margin during emergency (no TDRS) and special vents (such as a Soyuz relocation). Last time done: 6/26/07.]*

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Clay will copy the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*Reboost Update:* The ISS reboost performed on 7/23 at 6:06pm EDT was nominal, with a delta-V of 4.55 m/s and an altitude gain of 7.9 km. With this reboost, the STS-118 launch opportunities have been optimized. The reboost also made sure there were no re-contact concerns with the VSSA-FSE and the EAS Clay Anderson jettisoned earlier yesterday. "Clay did an awesome job jettisoning these items, exceeding the delta-V necessary to be safe."

Still on the Russian "time permitting" task list for Kotov and Yurchikhin remains equipment auditing/inventorying in the RS.

A second item on the discretionary task list is to take photo/video of the interior of the ISS Russian segment (RS) modules.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 9:08am EDT [= epoch]*):

Mean altitude -- 342.0 km

Apogee height -- 348.7 km

Perigee height -- 335.4 km

Period -- 91.38 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.000981

Solar Beta Angle -- 36.5 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude gain in the last 24 hours -- 7900 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49632

**Significant Events Ahead** (*all dates Eastern and subject to change*):

08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry

08/02/07 -- Progress M-61/26P launch

08/05/07 -- Progress M-61/26P docking (DC1 nadir)

08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)

08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)

08/21/07 -- STS-118/Endeavour/13A.1 landing

08/??/07 -- SSRMS setup for viewing PMA-3 relocation

08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]

09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1) & reentry

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)

10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing

10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
[*under review*]

10/20/07 -- (NET) STS-120/Discovery/10A docking

10/22/07 -- (NET) Node 2 relocation

10/29/07 -- (NET) STS-120/Discovery/10A undocking

11/06/07 -- US EVA-10

11/14/07 -- US EVA-11

11/20/07 -- US EVA-12

12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- (NET) STS-122/Atlantis/1E docking

12/12/07 -- Progress M-62/27P launch [*to be reviewed*]

12/13/07 -- (NET) STS-122 undocking

12/14/07 -- Progress M-62/27P docking

??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 07/23/07

**Date:** Monday, July 23, 2007 4:25:29 PM

**Attachments:**

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**FOR OFFICIAL USE ONLY**

### **ISS On-Orbit Status 07/23/07**

All ISS systems continue to function nominally, except those noted previously or below. *EVA Day. Wake-up was shifted 30 min earlier, to 1:30am EDT. Sleep will be equally earlier, at 4:30pm.*

FE-2 Anderson continued his current SLEEP experiment by accessing the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

Clay Anderson (EV1) and Fyodor Yurchikhin (EV2) **successfully completed EVA-9** with A/L (Airlock) hatch closure at 2:05pm EDT, followed by cleanup and post-EVA ops.

Accomplished tasks of this spacewalk were –

- Install a video stanchion at CP-7 (Camera Position 7) on the S0/P1 truss interface, from the VSSA (Video Stanchion Support Assembly);
- Reconfigure power connections at the SASA (S-band Antenna Support Assembly) on the S1 truss;
- Remove & replace the failed RPCM (Remote Power Controller Module) S04B\_F on the S0 truss which has impacted MT (Mobile Transporter) operations, and return old RPCM to A/L (Airlock);
- Install an APFR (Articulated Portable Foot Restraint) on the SSRMS (Space Station Remote Manipulator System);
- EV1 ingress APFR, maneuver to jettison position & jettison the integrated VSSA FSE (Flight Support Equipment) and EFRAM (EVA Flight-Releasable Attachment Mechanism), with a combined mass of ~212 lb, in retrograde direction [done at ~9:19am];

- Jettison the ~1400 lb Early Ammonia Servicer (EAS) [done at ~10:36am];
- Perform CBM (Common Berthing Mechanism) seal cleaning at Node nadir port (for PMA-3 relocation in late August); and
- Clean up, returning APFR to ESP-2 (External Stowage Platform 2) and ingress A/L [done at 2:05pm].

As Get-ahead Tasks, the crewmembers also removed GPS antenna #4, relocated an auxiliary bag from P6 to Z1, and released two fluid tray bolts on the Node Unity. *[Official start time of the spacewalk was 6:24am EDT, 6 minutes ahead of schedule. Total EVA duration (PET = Phase Elapsed Time) was 7 hrs 41 min. It was the 88<sup>th</sup> spacewalk for ISS assembly & maintenance and the 60<sup>th</sup> from the station (28 from Shuttle, 38 from Quest, 22 from Pirs) totaling 357h 24m. After today's EVA, a total of 97 spacewalkers (69 NASA astronauts, 20 Russians, and eight astronauts representing Japan-1, Canada-2, France-1, Germany-1 and Sweden-3) have logged a total of 544h 48m outside the station on building, outfitting and servicing. It also was the 110<sup>th</sup> spacewalk by U.S. astronauts.]*

Before spacewalk begin, the Crewlock (CL) hatch was cracked for a hygiene break/ with mask prebreathe for Yurchikhin and Anderson, after spending the night on 10.2 psi campout. Around 3:00am, the hatch was closed again for a continued depress period at 10.2 psi.

FE-1 Kotov, who provided IVA (intravehicular activities) support, used a DCS 760 EVA camera for documenting the hatch closure and ensured Lab science window shutter closure.

Oleg also set up the final configuration of the STTS onboard audio subsystem to support the EVA.

After the spacewalk, the FE-1 reset the STTS comm system was reset to the original conditions and reconfigured the DCS 760 EVA cameras.

In addition, Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Later tonight (4:20pm EDT), ISS attitude control authority will be handed over to Russian MCS (Motion Control System) thrusters for maneuvering to reboost attitude at 4:25pm. After the reboost firing, the station, at ~6:45pm, will maneuver to +XVV TEA (+X-Axis in Velocity Vector/Torque Equilibrium Attitude) and control authority will return to US Momentum Management at ~7:30pm.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this 7:29am EDT [= epoch]*):

Mean altitude -- 334.1 km  
Apogee height -- 341.8 km  
Perigee height -- 326.5 km  
Period -- 91.21 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0011421  
Solar Beta Angle -- 31.7 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in the last 24 hours -- 75 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49650

**Significant Events Ahead** (*all dates Eastern and subject to change*):

08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry  
08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 “Harmony”, racks [*under review*]  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11

11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/22/07  
**Date:** Sunday, July 22, 2007 1:20:46 PM  
**Attachments:**

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### **ISS On-Orbit Status 07/22/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – pre-EVA day for Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Clay Anderson). Ahead: Week 14 of Increment 15.*

FE-2 Anderson continued his current SLEEP experiment by accessing the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

Before breakfast, the two designated spacewalkers, Yurchikhin & Anderson, completed another session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis, with Kotov assisting as CMO (Crew Medical Officer). *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

After breakfast, Yurchikhin and Anderson also were subjects for the second part of the PHS/without blood labs assessment, the FE-1 again assisting the CDR & FE-2 as CMO. Afterwards, Oleg completed data entry for all of them and stowed the PHS and MO-9 hardware. *[The U.S. PFE w/o Blood Lab is a monthly 1.5-hr. procedure which checks up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (cycle ergometer with vibration isolation) in the*

*Lab. Readings are taken with the BP/ECG (blood pressure/electrocardiograph) and the HRM (heart rate monitor) watch with its radio transmitter. BP/ECG provides automated noninvasive systolic and diastolic blood pressure measurements while also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise.]*

Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Oleg also gathered data on total operating time & "On" durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

In preparation for tomorrow's EVA-9, the FE-1 charged the batteries for the DCS-760 EVA cameras and later set up the cameras in the Airlock (A/L) for the spacewalk.

Anderson and Yurchikhin worked in the A/L, configuring the Crew Lock (CL) for their campout.

Clay powered up the Lab Cupola RWS (Robotic Workstation) and A/L PCS (Portable Computer System) laptops to support the SSRMS (Space Station Remote Maneuvering System) and the Campout.

The FE-1 meanwhile installed a HEC (headset extension cable) on the PMIC (portable microphone) in the Lab to support his duties as IV (Intravehicular) crewmember.

Clay powered down the amateur radio equipment in the SM and FGB to prevent RF interference with EVA communication links, to be turned back on after the spacewalk.

Oleg prepared three Russian "Pille-MKS" radiation dosimeters, recorded their dosages and equipped each of the two EMUs (Extravehicular Mobility Unit) with a radiation sensor (A0309/CDR & A0310/FE-2). In addition, Oleg transferred Fyodor's ID-3 personal dosimeter, normally worn on the flight suit, to the chest pocket of the CDR's LCVG (Liquid Cooling & Ventilation Garment), later to be returned to the flight suit. On 7/24, after the EVA, readings from all dosimeters will be recorded and downlinked. *[A third sensor, A0308, was placed in the SM on the PULT reader for background readings.]*

At ~9:45am EDT, the crew tagged up with ground specialists to discuss EVA-9 details via S- & Ku-Band.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

After dinner (2:20pm EDT), final preparations for tomorrow's spacewalk will include the following steps:

- 10.2psi ops initiated in A/L by MCC-H --- 2:15am
- Crew Campout mask prebreathe --- 3:20pm–4:30pm
- Sleep for CDR & FE-2 in A/L --- 5:00pm–1:30am (7/23)
- Hygiene break --- 2:00am–3:10am
- Campout EVA preps begin --- 3:20am
- EMU spacesuits purge begins --- 4:50am
- EMU prebreathe begins --- 5:05am
- CL depress begins --- 5:55am
- A/L Egress --- ~6:30am.

Per ground command, the SSRMS was maneuvered to EVA initial position at 9:05am, and the VDS (Video Distribution System) was configured.

*[EVA-9 will last approximately 6.5 hrs and will be conducted by Anderson (EV1) and Yurchikhin (EV2). Its major objectives are to - (1) install a video stanchion at CP-7 (Camera Position 7) on the S0/P1 truss interface, from the VSSA (Video Stanchion Support Assembly); (2) reconfigure power connections at the SASA (S-band Antenna Support Assembly) on the S1 truss; (3) remove & replace the failed RPCM (Remote Power Controller Module) S04B\_F on the S0 truss and return old RPCM to A/L (Airlock); (4) install an APFR (Articulated Portable Foot Restraint) on the SSRMS (Space Station Remote Manipulator System); (5) EV1 ingress APFR, maneuver to jettison position & jettison the integrated VSSA FSE (Flight Support Equipment) and EFRAM (EVA Flight-Releasable Attachment Mechanism) in retrograde direction; (6) release & jettison the EAS (Early Ammonia Servicer, mass ~1400 lbs); (7) egress SSRMS and translate to Node nadir port; (8) perform CBM (Common Berthing Mechanism) cleaning at Node nadir port (for PMA-3); (9) clean up (return APFR to External Stowage Platform 2) and ingress A/L. Possible get-ahead tasks would be removal of GPS antenna #4 and relocation of an auxiliary bag from P6 to Z1.]*

Tonight at 6:00pm, the ISS will maneuver on USTO (US-commanded RS Thrusters only) from +XVV (+X-axis in velocity vector) to -XVV, i.e. turning by ~180 degrees to fly backward, with 25P at the SM aft end flying forward, in readiness for

conducting the EAS post-jettison avoidance reboost after the EVA at ~4:25pm. Station attitude will then return to the nominal +XVV.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 3:32am EDT [= epoch]*):

Mean altitude -- 334.2 km  
Apogee height -- 342.0 km  
Perigee height -- 326.5 km  
Period -- 91.22 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.001155  
Solar Beta Angle -- 27.0 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in the last 24 hours -- 70 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49632

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/23/07 -- US EVA-9 (6:30am EDT)  
07/23/07 -- ISS reboost with Progress 25P (4:25pm)  
08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry  
08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks

*[under review]*

10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/21/07  
**Date:** Saturday, July 21, 2007 12:53:31 PM  
**Attachments:**

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**ISS On-Orbit Status 07/21/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 15 crew CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Clay Anderson, except for regular maintenance & voluntary work.*

FE-2 Anderson continued his current SLEEP experiment by accessing the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, Fyodor and Oleg also performed preventive maintenance cleaning on SM fans & grilles VPkhO, VdPrK, VPrK, and on the V3 ventilator grill in the DC1 (Docking Compartment).

The FE-1 serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The regen process will be terminated at ~5:15pm EDT.

*[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods. Filter bed 1 was regenerated yesterday.]*

The CDR relocated stowage equipment from rack fronts in the Node to allow access for subsequent connector stringing/mating to power feeders for the activation of SNTs (voltage & current stabilizers/transformers) #3 & #4 for providing converted US power to the Russian segment (RS). Afterwards, Fyodor returned the stowage items to their initial locations.

The FE-2 filled out the regular FFQ (Food Frequency Questionnaire), his fourth, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Yurchikhin performed closure tests on the shutter drive of SM window #9, using a stopwatch and observing the shutter motion from near window #9 after electric drive activation via laptop. The test included photography of the shutter with its safety coupling with the Nikon D1X camera.

Oleg Kotov made preparations for his standard pre-EVA PHS (Periodic Health Status) assessment, scheduled tomorrow, including retrieving and setting up a new ABPC (Automatic Blood Pressure Cuff) from the IMAK (ISS Medical Accessory Kit) and discarding the old unit. *[The fitness evaluation involves configuring the AMP (ambulatory medical pack) and the MEC (medical equipment computer) and opening the IFEP (in-flight examination program) software on the MEC laptop. The PHS is performed every 30 days by each crewmember and two weeks before landing and as clinically indicated.]*

Fyodor performed the weekly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), checking the condition of the roller bearings and recording its time & date values.

Clay conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

At ~9:25am EDT, the crew members held their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Clay will copy the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~11:00am and ~2:30pm EDT, Anderson had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

*Reboost Test Update:* At 7:15pm-7:20pm EDT last night, TsUP/Moscow conducted a single-burn reboost test using the eight DPO (Approach & Attitude Control) thrusters of Progress 25P (docked at the SM aft port), the US-21 Matching Unit (which relates the control commands from the SM computers, running on the new 7.05 software, to the Progress), and propellants from the 25P refueling system. The purpose of the reboost was to test the reboost capability prior to the EAS (Early Ammonia Servicer) Avoidance reboost on 7/23, as well as to set up proper phasing conditions for 26P and STS-118/13A.1. The burn was nominal (within 5%). The burn produced a delta-V of 1.05 m/s (predicted: 1.0), boosting mean orbital altitude by 1.82 km (0.98 nmi) to 334.1 km (180.4 nmi), with 347.3 km (187.6 nmi) apogee height and 320.8 (173.2 nmi) perigee height of the slightly elliptical orbit.

*ASN Testing Update:* Without requiring crew action, TsUP/Moscow today is testing the NVM-1 and NVM-2 Navigation Computer Modules of the ASN Satellite Navigation Equipment using new software (vers. 01.06).

### **Weekly Science Update** (*Expedition Fifteen – 13<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Shielding tile removal and ALTEINO rotation were performed on 7/17. The data file was downlinked on 7/18 and file size was reported by the crew. The file size is smaller than expected. Science team will assess upon receipt of the data / photos

*ANITA:* Planned.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2*: Continuing.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS)*: Continuing,

*CFE (Capillary Flow Experiment)*: Reserve.

*CHROMOSOME-2 (E14 SFP)*: Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus)*: Powered off. Waiting to support other experiments such as BCAT.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2)*: Powered off. Contains CSI-01, awaiting return home on 13A.1.

*EarthKAM (Earth Knowledge Acquired by Middle School Students)*: Next scheduled operation is 10/29-11/3.

*EMCH (Elastic Memory Composite Hinge)*: Complete.

*EPO (Educational Payload Operation) Kit C*: Planned.

*IMMUNO (Saliva Sampling)*: First session currently scheduled 7/26.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*: Complete.

*MISSE (Materials ISS Experiment)*: Ongoing.

*MTR-2 (Russian radiation measurements)*: Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1*: Planned

*MUSCLE (E14 SFP)*: Completed.

*MSG-SAME (Microgravity Science Glovebox)*: Planned.

*NEOCYTOLYSIS (E14 SFP)*: Completed.

*NOA-2 (Nitric Oxide Analyzer)*: Planned.

*NUTRITION*: Planned.

*SAMPLE*: Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems)*: Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight)*: Clay's SLEEP data downlink was completed on 7/20.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite)*: Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft)*: In progress.

*TRAC (Test of Reaction & Adaptation Capabilities)*: Planned.

*CEO (Crew Earth Observations)*: Through 7/13 the ground has received a total of 7,775 CEO images for review and cataloging for Increment 15. A beautiful, long-lens, oblique view of the Upheaval Dome (an active CEO target) in the Canyonlands National Park of southern Utah will be published on NASA/GSFC's Earth Observatory website this weekend. Acquired earlier in Expedition 15 this image provides a very nice sense of the topography within and around the impact structure. CEO will continue to seek a nadir view with the long lens of this target. "We received notice this morning that you were able to photograph the Tigris-Euphrates target on 7/19. Thanks for the feedback. We greatly appreciate and look forward to any of this kind of information you can provide."

Today's CEO (Crew Earth Observation) photo targets were **Vredefort Impact Crater** (*this large, ancient impact straddles the Vaal River valley in central South Africa. It is about 300km in diameter, and the western and northern edges are a major regional landmark. The crew's clear weather pass was in early afternoon light. As ISS approached from the NW, the crew was to shoot just left of track and try to map the northern semicircle from W to E in detail*), **Sao Paulo, Brazil** (*this rapidly growing Brazilian megacity has a population variously estimated between 11 and 18 million people. It is surrounded by forest hills and situated just inland from coast of southern Brazil. The track of this nadir pass was from the NW in midday fair skies. As ISS passed over the interior of South America, the crew was to look ahead to the coast and try to spot the city in advance, then try for detailed nadir views of the urban margins only*), and **Johnston Island reef, central Pacific** (*Johnston Island is a low sand and coral island, 717 miles WSW of Honolulu. It is only 1,000 yards long and about 200 yards wide. It is part of an ongoing international inventory and monitoring effort of the Earth's coral reef resources. The crew had a nadir, mid-morning pass and their target was under partly cloud tropical*

skies. Using the long lens settings to map in detail the coral reef structures in the vicinity of the island).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:31am EDT [= epoch]*):

Mean altitude -- 334.3 km

Apogee height -- 342.1 km

Perigee height -- 326.5 km

Period -- 91.22 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0011603

Solar Beta Angle -- 22.3 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude gain in the last 48 hours -- 1710 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49618

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/23/07 -- US EVA-9 (6:30am EDT)

07/23/07 -- ISS reboost with Progress 25P

08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry

08/02/07 -- Progress M-61/26P launch

08/05/07 -- Progress M-61/26P docking (DC1 nadir)

08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)

08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)

08/21/07 -- STS-118/Endeavour/13A.1 landing

08/??/07 -- SSRMS setup for viewing PMA-3 relocation

08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

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12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/20/07  
**Date:** Friday, July 20, 2007 12:27:30 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 07/20/07**

All ISS systems continue to function nominally, except those noted previously or below.

***Today 38 years ago, Apollo 11 fulfilled a dream of Earth people when Neil Armstrong and Buzz Aldrin landed their LM "Eagle" on the Moon at Tranquility Base, with Michael Collins orbiting overhead in the mothership Columbia.***

FE-2 Anderson continued his current SLEEP experiment by accessing the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

CDR Yurchikhin supported the transition of the Russian Central Post Computer #2 (TsPK2) and Laptop 2 to the new SM 7.05 software load. *[Wednesday (7/18) evening TsUP/Moscow successfully completed the transition of all SM TsVM (Central) and TVM (Terminal) computers/lanes to 7.05. The computers were nominally restarted with no issues. Yesterday (7/19) morning the crew powered off Laptop 2 and powered on Laptop 1 which was then confirmed to be correctly communicating with the TsVM and TVM computers. The telemetry and command systems at TsUP have also been successfully updated with the new software load.]*

As next step, FE-1 Kotov worked on transitioning ("ghosting" or "cloning") Laptop 2 itself to vers. 7.05 from DVD, after booting it up on its temporary boot provision. Laptop 1 was then deactivated.

After tagging up with specialists, Kotov then activated and monitored the ground-performed tests of the communications path between the SM Central Post Computer 2 (CPC2/KTsP2), Laptop 2 and the TsVM on the new SM 7.05 software (which enables interfacing between the ASN Satellite Navigation Equipment and PCE Proximity Communication Equipment for the ATV Automated Transfer Vehicle). *[This link was tested earlier with the previous software version 7.03.]*

Kotov also started the periodic regeneration of the Russian Harmful Impurities Removal System (BMP) by initiating the "bake-out" cycle to vacuum on absorbent bed #1 of the dual-channel filtration system. The bake-out will be terminated at ~5:15pm EDT. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

After the very successful EVA-9 dry-run yesterday, FE-2 Anderson configured the dried-out EMU spacesuits in the Airlock (A/L) for next week's (7/23) spacewalk by himself and Yurchikhin.

Later, the crew conducted a joint EVA procedures review and tagged up with MCC-H via S- and Ku-band to discuss details.

Clay Anderson then spent time on configuring the necessary EVA tools.

Clay also performed the regular bi-weekly maintenance reboots of the SSC (Station Support Computer) File Server and OCA Comm Router laptops.

Yurchikhin completed the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[Purpose of the 10-min. activity is to correlate the hand-held readings with MCA (Major Constituents Analyzer) measurements. Two CSA-CP (CSA-Combustion Products) instruments recorded O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post (#1057, prime) and in the Node (#1060, backup), while the CSA-O<sub>2</sub> units (#1056, #1059) looked for O<sub>2</sub> in the Lab and the CDMK (#1007) for CO<sub>2</sub> in SM and Lab. Also recorded were battery ticks. The instruments were turned off afterwards, except for the prime CSA-CP #1057 unit, and returned to their regular locations.]*

Oleg conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Fyodor will copy the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~3:55am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~2:00pm, the crew is scheduled for their regular weekly tagup with the Lead Flight Director at MCC-Houston, via S- & Ku-band.

At ~3:35pm, Fyodor, Oleg and Clay will conduct their standard weekly teleconference with the JSC Astronaut Office, via S-band S/G audio.

*Reboost Test on SM 7.05:* At 7:15pm - 7:20pm EDT tonight, TsUP/Moscow will conduct a single-burn reboost test using the eight DPO (Approach & Attitude Control) thrusters of Progress 25P (docked at the SM aft port), the US-21 Matching Unit (which relates the control commands from the SM computers, running on the new 7.05 software, to the Progress), and propellants from the 25P refueling system.

*SAFER OBT Anomaly:* During scheduled SAFER OBT (Simplified Aid for EVA Rescue Onboard Training) on 7/17, the computer program would not respond to any Hand Control Module inputs and the crew could not perform SAFER OBT as planned. However, there is no formal requirement for EVA-9 to perform this refresher training. The crew is sufficiently current with operating SAFER. EVA and VR (Virtual Reality) Lab specialists are looking into troubleshooting steps to be performed prior or post EVA-9 per crew preference.

Today's CEO (Crew Earth Observation) photo targets were **Ouarkziz Impact Crater** (*Ouarkziz is a relatively "young" impact crater, dated at 70 million years. The crater is 3.5 km in diameter and is located in the Atlas Mountains of northwestern Algeria near the border with Morocco. As ISS crossed the Atlas Mountains from the NW in late morning look for the impact in folded rocks near the south side of the east-west mountain range. There may have been a few scattered clouds but the crew had a nadir pass*), **Mozambique** (*this target area is in the coastal plains of far southern Mozambique just north of the capital city of Maputo.*

*Rapid development of this area is now being planned. To better monitor this change CEO is seeking baseline, pre-development imagery. ISS approach was from the NW near midday. Partly cloudy skies were expected and researchers requested a nadir mapping strip of this area along the orbit track. There are very few strong landmarks or visual features that can be used as guide), and **Sevilleta Wildlife Area, New Mexico** (this Long Term Ecological Research [LTER] site is located in the Rio Grande River Valley, primarily south of the city of Albuquerque. ISS approached from the NW in mid-morning, with fair skies expected. The crew was to begin a detailed, nadir mapping strip at Albuquerque and work southward along the east side of the river).]*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:03am EDT [= epoch]*):

Mean altitude -- 332.6 km

Apogee height -- 338.7 km

Perigee height -- 326.5 km

Period -- 91.18 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.000906

Solar Beta Angle -- 17.7 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in the last 48 hours -- 75 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49603

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/23/07 -- US EVA-9 (6:30am EDT)

07/23/07 -- ISS reboost with Progress 25P

08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry

08/02/07 -- Progress M-61/26P launch

08/05/07 -- Progress M-61/26P docking (DC1 nadir)

08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)

08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)

08/21/07 -- STS-118/Endeavour/13A.1 landing

08/??/07 -- SSRMS setup for viewing PMA-3 relocation

08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]

09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/19/07  
**Date:** Thursday, July 19, 2007 12:30:15 PM  
**Attachments:**

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### **ISS On-Orbit Status 07/19/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 100 of Expedition 15.*

Early in the morning, CDR Yurchikhin turned off Laptop 2 and powered up Laptop 1 in support of a ground-performed checkout of the Russian Laptop1-KTsP1(CPC1)-TsVM-TVM computer comm path with the new SM (Service Module) 7.05 software.

FE-2 Anderson continued his current SLEEP experiment by accessing the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

Anderson worked on the OpsLAN printer, printing out the final uplinked procedures for the spacewalk on 7/23, preparatory to the EVA dry-run later today.

FE-1 Kotov assisted in the reactivation of the Elektron O<sub>2</sub> generator at 32 amps, monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Continuing the extended leak checking of the spare BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator, Kotov charged the unit once again with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#21). The last test pressurization was on 4/6 by

Tyurin. *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

The Vozdukh CO<sub>2</sub> (Carbon Dioxide) removal system, which was switched off yesterday, was activated by Yurchikhin in manual mode 5.

As standard pre-EVA health status assessment, Clay Anderson took the general U. S. PFE (Periodic Fitness Evaluation), a monthly 1.5-hr. procedure to check up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (Cycle Ergometer with Vibration Isolation) in the Lab. Oleg Kotov assisted Clay as CMO (Crew Medical Officer). Readings were taken with the BP/ECG (Blood Pressure/Electrocardiograph) and the HRM (Heart Rate Monitor) watch with its radio transmitter. *[BP/ECG provides automated noninvasive systolic and diastolic blood pressure measurements while also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise.]*

While Oleg Kotov did the daily routine maintenance of the SOZh environmental control & life support systems in the SM, CDR Yurchikhin worked on the ASU toilet facilities systems to perform the periodic replacement of the toilet's urine receptacle (MP) and filter insert (F-V), stowing the old units for disposal. (Last time done: 4/27).

The CDR also performed routine IFM (in-flight maintenance) on the SRVK-2M condensate water processor, removing its multifiltration unit (BK), which has reached its service life limit. The old BK was replaced with a new unit and stowed for deorbiting in Progress 24. *[BK contains five purification columns to rid the condensate of dissolved mineral and organic impurities and has a service lifetime of ~450 liters throughput. The water needs to be purified for proper electrolysis in the Elektron O<sub>2</sub> generator.]*

Oleg Kotov serviced the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G growth payload in the Lada-10/MIS (Module for the Investigation of Substrates) greenhouse, collecting measurement reading for downlink, conducting the periodic documentary photography and filling the KDV water tank from the spare KOV-EDV container.

Oleg also did the IMS (Inventory Management System) updating today, editing its standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The FE-2 conducted the weekly 10-min CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water callowns are sent up*

*every other week.]*

Starting after lunch (~9:40am EDT), the crew undertook the scheduled dry-run of the EVA-9 in the Joint Airlock (A/L), stepping through –

- Campout mask prebreathe,
- Hygiene break,
- Campout preps in A/L Crew Lock (CL),
- EMU purge,
- EMU prebreathe,
- CL depress,
- CL post-depress,
- CL repress, and
- Post-EVA ops, consisting of EMU dry-run cleanup ops, simulated CDR/FE-2 EMU glove inspection for cuts, EVA dry-run conference with ground specialists via Ku- & S-band, and
- Replacement of METOX (Metal Oxide) CO<sub>2</sub> canisters and batteries.

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2/PFE), TVIS treadmill (CDR, FE-1), RED resistive exercise device (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Clay will copy the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:05pm EDT, FE-1 Kotov is scheduled for a PAO/TV downlink with greetings to the participants of the Russian educational forum "Seliger 2007", and to the participants of a gala meeting dedicated to the 60<sup>th</sup> Anniversary of the Russian Federal Bio-Medical Agency.

Today's CEO (Crew Earth Observation) photo targets were **Tigris-Euphrates Delta** (*the complex delta of these famous rivers is located at the head of the Persian Gulf and is shared by the countries of Iraq and Iran. The recent evolution and character of this delta continues to be intensely altered by human activities. This ISS pass descended the Tigris-Euphrates Valley in late morning light and clear weather. Trying for a detailed mapping pass of the Iranian [east] side of the main channel from just east of Basra to the tidal flats on the coast*), **Lake Nasser, Toshka Lakes, Egypt** (*Lake Nasser is a massive impoundment of the waters of the Nile River by the Aswan Dam located in southeastern Egypt. ISS approached this target from the NW in late morning with clear, hot desert skies. On this nadir pass the crew was to*

look for evidence of lake level changes, locating the airport and dam to the south of the city of Aswan and mapping in detail the dam and eastern shoreline of the northern part of lake), and **Beaverhead Impact Crater** (this 600 million year old impact site is located in the Salmon River Mountains of central Idaho. Even though it is about 60km in diameter the shape and dimension are no longer readily apparent because of active mountain-building and erosion processes since it formed. On this mid-morning pass with clear skies, the crew was to try for a nadir mapping of the whole Salmon River Mountain complex in broad contextual views with the short lens settings).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:26am EDT [= epoch]):

Mean altitude -- 332.6 km  
Apogee height -- 338.6 km  
Perigee height -- 326.5 km  
Period -- 91.18 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0009129  
Solar Beta Angle -- 13.1 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in the last 48 hours -- 80 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49587

**Significant Events Ahead** (all dates Eastern and subject to change):

07/20/07 -- Thruster/reboost test of functionality of new Russian software (vers. 7.05)  
07/23/07 -- US EVA-9 (6:30am EDT)  
07/23/07 -- ISS reboost with Progress 25P  
08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry  
08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 07/18/07  
**Date:** Wednesday, July 18, 2007 12:40:05 PM  
**Attachments:**

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### **ISS On-Orbit Status 07/18/07**

All ISS systems continue to function nominally, except those noted previously or below.

The three crewmembers began the day with the standard fit check of the Kazbek couches, the contoured shock absorbing seats in the Soyuz 14S (the first for the Expedition 15 crew after the docking). *[For the fit check, crewmembers remove their cabin suits and don Sokol KV-2 suit and comm caps, getting into in their seats and assessing the degree of comfort and uniform body support provided by the seat liner. Using a ruler, they then measured the gap between the top of the head and the top edge of the structure facing the head crown. The results were reported to TsUP. Kazbek-UM couches are designed to withstand g-loads during launch and orbital insertion as well as during reentry and brake-rocket-assisted landing. Each seat has two positions: cocked (armed) and noncocked. In cocked position, they are raised to allow the shock absorbers to function during touchdown. The fit check assures that the crewmembers, whose bodies gain in length during longer-term stay in zero-G, will still be adequately protected by the seat liners for their touchdown in Kazakhstan, either emergency or regular return (14S serves as CRV {crew return vehicle} in the event of a contingency.)]*

Afterwards, Yurchikhin, Anderson and Kotov conducted a joint review of procedures for tomorrow's scheduled EVA-9 dry-run.

In preparation for the spacewalk dry-run in the "Quest" Airlock (A/L), Fyodor and Clay, the two spacewalkers, configured systems in the A/L as get-ahead steps for the subsequent preparations of the A/L's Equipment Lock (EL) which were completed later in the day.

Yurchikhin and Anderson also performed checkouts of the two EMUs, #3006 & #3008, with their LCVGs (Liquid Cooling & Ventilation Garments) connected, and of the proper functioning of the SCU (Service & Cooling Umbilical) O<sub>2</sub> poppets.

As part of the spacesuit preparations, Clay and Fyodor installed the EMU REBAs (Rechargeable EVA Battery Assemblies) and checked out the powered suit hardware (glove heaters, EMU TV).

Yurchikhin deactivated the Vozdukh CO<sub>2</sub> removal system in preparation of the software loading of the Russian TVM terminal (navigation) computer and TsVM central (command) computer. The two triple-redundant computers were to be upgraded with the new SM 7.05 software during the crew's sleep period. *[7.05 will enable data interfaces between the ASN (Satellite Navigation Equipment) and PCE (Proximity Communication Equipment) for the ATV (Automated Transfer Vehicle). In preparation for the final restart of the RS (Russian segment) computers to activate the SM7.05 software, the USOS (US segment) will be inhibiting the automatic US-to-RS handover and GNC MDM RM (Guidance, Navigation & Control Multiplexer/Demultiplexer Redundant Management) about 15 min prior to the restart of the Russian computers. In the unlikely event of a 'Loss of ISS Attitude Control' warning or 'Primary GNC MDM Fail' caution annunciation, ISS will remain in free drift until the Russian computers are recovered to an operational state (low data rate will be manually commanded by the ground in the event the Primary GNC MDM failed).]*

The CDR also performed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water collected in CWCs from the Lab CCAA (Common Cabin Air Assembly) dehumidifier. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Yurchikhin conducted the periodic hardware health check on the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) and dumped the spectrometer data for subsequent downlink via the OCA comm system. *[ALTCRISS uses the ACT spectrometer originally employed by VC8 guest cosmonaut Roberto Vittori in the DC1 for the Italian LAZIO (Low Altitude Zone/Ionization Observatory) experiment.]*

It was Oleg Kotov's turn today for his second session with the Russian experiment DYKHANIE ("respiration", "breathing"), tagged up with ground specialists and conducted the session, later closing down and stowing the equipment. *[Dykhanie-1 gear uses two belts (PG-T/thoracic, PG-A/abdominal), a calibrator, resistor, mouthpiece, etc., to study fundamental physiological mechanisms of the external breathing function of crewmembers under long-duration orbital flight conditions. During the experiment, physiological measurements are taken and recorded with a*

*pneumotachogram, a thoracic pneumogram, an abdominal pneumogram, and pressure data in the oral cavity. All experimentally derived plus salient environmental data along with personal data of the subject are recorded on PCMIA card for return to the ground at end of the Expedition. Objectives include determining the dynamics of the relationship between thoracic (pectoral) and abdominal breathing function reserves and their realization potential during spontaneous breathing, the coordinated spontaneous respiratory movements in terms of thoracic and abdominal components of volumetric, time & rate parameters of spontaneous respiratory cycle, identification of the features of humoral-reflex regulation of breathing by dynamics of ventilation sensitivity of thoracic and abdominal components to chemoreceptor stimuli, etc. Overall, the experiment is intended to provide a better understanding of the basic mechanisms of pulmonary respiration/gas exchange gravitational relations of cosmonauts.]*

After connecting UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cables at the Lab & Cupola RWS (Robotics Work Stations) for the SSRMS (Space Station Remote Manipulator System) video coverage of his subsequent operation with the robotarm, FE-1 Kotov configured the POC DOUG (*Portable Onboard Computer/Dynamic Operations Ubiquitous Graphics*) software application and conducted the regular one-hour review of the DOUG setup.

Afterwards, with the Lab window shutter closed for protection, Oleg worked with the SSRMS, taking it through the necessary maneuvers to have it grapple the PDGF-4 (Power & Data Grapple Fixture 4) on the cart-mounted MBS (Mobile Base System), in preparation for EVA-9.

Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables, the regular check on ongoing US condensate processing for use in the Elektron, and today also the periodic (~monthly) checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

Kotov did the IMS (Inventory Management System) updating today, editing its standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Anderson conducted the periodic (every two weeks) inspection of the RED (Resistive Exercise Device) with canister cords and accessory straps as well as the canister bolts for re-tightening if required.

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-1), TVIS treadmill (CDR, FE-2), RED resistive exercise device (FE-

2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Clay will copy the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

With the Elektron-VM O<sub>2</sub> (oxygen) generator currently off, cabin air refreshes are being performed from Progress M-59/24P storage (SrPK) as required.

*Completed yesterday but not reported:* FE-2 Anderson worked on ER5 (EXPRESS Rack #5), relocating items stored in Drawer 2 to make room for the ELITE-S2 payload hardware arriving with 13A.1. *[The Italian (ASI) experiment ELITE-S2 (Elaboratore Immagini Televisive - Space 2) is a human motion analysis facility for technological characterization and potential application for multifactorial movement analysis, to study the connection between brain, visualization and motion in micro-G. By recording and analyzing the three-dimensional motion of astronauts, this study should help engineers apply ergonomics into future spacecraft designs and determine the effects of weightlessness on breathing mechanisms for long-duration missions. This task was deferred from 7/12]*

Today's CEO (Crew Earth Observation) photo targets were **South Mozambique** *(this target area is in the coastal plains of far southern Mozambique just north of the capital city of Maputo. Rapid development of this area is now being planned. To better monitor this change CEO is seeking baseline, pre-development imagery. ISS approach was from the NW in early afternoon. Fair weather was expected, and researchers were requesting a nadir mapping strip of this area along orbit track. There are very few strong landmarks or visual features to be used as guide),* **Georgia Coastal Ecosystems** *(the Georgia Coastal Ecosystem is a Long Term Ecological Research [LTER] Site and consists of a barrier island and marsh complex located on the central Georgia coast in the vicinity of the Altamaha River, one of the largest and least developed rivers on the east coast of the United States. The crew had a mid-morning pass with partly cloudy conditions and was to try for a detailed mapping of the coast from near Savannah, Georgia in the N to near Jacksonville, Florida in the S),* and **Sierra Madera Impact Crater** *(this 100 million year old impact site is located in the Trans-Pecos region of far west Texas about 20 miles south of Fort Stockton. The isolated, 13km in diameter uplifted area is situated just east of US Highway 385. ISS had a nadir pass at midday in fair weather).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are

downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:06am EDT [= epoch]*):

Mean altitude -- 332.7 km  
Apogee height -- 338.7 km  
Perigee height -- 326.7 km  
Period -- 91.19 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0008968  
Solar Beta Angle -- 8.6 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in the last 48 hours -- 88 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49571

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/20/07 -- Thruster/reboost test of functionality of new Russian software (vers. 7.05)  
07/23/07 -- US EVA-9 (6:30am EDT)  
07/23/07 -- ISS reboost with Progress 25P  
08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry  
08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks [*under review*]  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11

11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/17/07  
**Date:** Tuesday, July 17, 2007 12:28:08 PM  
**Attachments:**

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### **ISS On-Orbit Status 07/17/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-1 Kotov took another turn today on the Russian PNEVMOKARD experiment, performing his second session (which forbids moving or talking during data recording). The experiment is controlled from the RSE-Med A31p laptop, equipped with new software, and uses the TENSOPPLUS sphygmomanometer to measure arterial blood pressure. *[PNEVMOKARD (Pneumocard) purports to obtain new scientific information to refine the understanding about the mechanisms used by the cardiorespiratory system and the whole body organism to spaceflight conditions. By recording (on PCMCIA cards) the crewmember's electrocardiogram, impedance cardiogram, low-frequency phonocardiogram (seismocardiogram), pneumotachogram (using nose temperature sensors), and finger photoplethysmogram, the experiment supports integrated studies of (1) the cardiovascular system and its adaptation mechanisms in various phases of a long-duration mission, (2) the synchronization of heart activity and breathing factors, as well as the cardiorespiratory system control processes based on the variability rate of physiological parameters, and (3) the interconnection between the cardiorespiratory system during a long-duration mission and the tolerance of orthostatic & physical activities at the beginning of readaptation for predicting possible reactions of the crewmembers organism during the their return to ground.]*

Oleg Kotov also set up the Russian biomedical "Pilot" experiment (MBI-15), which requires a table, ankle restraint system, electrodes, and two hand controllers (RUP) for testing piloting skill in "flying" simulations on a laptop (RSK1) under stopwatch control. He then conducted the experiment for the first time this Increment, supported by tagup with ground specialists via S-band. The Pilot-SMP-P gear, which was also used by CDR Yurchikhin last week (7/12), was then torn down and stowed. *[Oleg had to perform three flight control modes (fixed, slow and fast free-*

*flyer), each one at least five times, after checkout and calibration of the control handles. MBI-15 was done the last time by Tyurin, Lopez-Alegria and Kotov during the joint E14/E15 period in April 2007.]*

After the regenerable two-channel Vozdukh CO<sub>2</sub> scrubber had been running in Mode 1 (automatic cycle switching control) since yesterday, Yurchikhin today switched it back to Mode 5 (manual control).

FE-2 Anderson serviced the MELFI (Minus-Eighty Laboratory Freezer for ISS), first exchanging box modules (trays) between two different Dewars (Dewar 1 Tray A with Dewar 3 Tray C, then Dewar 1 Tray D with Dewar 3 Tray D). Afterwards, he removed desiccant from Dewar 4 and put contact cards from the MELFI Dewars into the MELFI CTB (cargo transfer bag).

In the Node, Oleg Kotov set up the ROBoT simulator, configuring and powering up its two A31p laptops (#1009 & SSC-10) which he then used to review simulator procedures and perform a robotics proficiency training for operating the SSRMS (Space Station Remote Manipulator System) during the EVA-9, during which he will maneuver the robotarm as IV (Intravehicular) crewmember. After the simulation session, the A31p's were reconfigured for their normal SSC (Station Support Network) functions. *[ROBoT uses DOUG (Dynamic Operations Ubiquitous Graphics) software, a hand controller and two laptops (one for graphics, one for the simulation) for on-orbit training of MSS (Mobile Service System) and SSRMS (Space Station Remote Manipulator System) operations. Robotics skills degrade over time similar to piloting skills.]*

Fyodor Yurchikhin spent several hours in the Service Module (SM) checking out its BVS computer system, first by testing the communications paths between the SM Central Post Computer 1 (CPC1/KTsP1), the TsVM command computer and the TVM navigation computer using Laptop 1 and the new SM 7.05 software (which enables interfaces between the ASN Satellite Navigation Equipment and PCE Proximity Communication Equipment for the ATV Automated Transfer Vehicle). Later, the same comm link tests were conducted between KTsP2, TsVM and TVM using Laptop 2, with the computers still running on the earlier software version 7.03.

The CDR set up the equipment for his second session with the Russian experiment DYKHANIE ("respiration", "breathing"), tagged up with ground specialists and conducted the session, later closing down and stowing the equipment. *[Dykhanie-1 gear uses two belts (PG-T/thoracic, PG-A/abdominal), a calibrator, resistor, mouthpiece, etc., to study fundamental physiological mechanisms of the external breathing function of crewmembers under long-duration orbital flight conditions. During the experiment, physiological measurements are taken and recorded with a*

*pneumotachogram, a thoracic pneumogram, an abdominal pneumogram, and pressure data in the oral cavity. All experimentally derived plus salient environmental data along with personal data of the subject are recorded on PCMIA card for return to the ground at end of the Expedition. Objectives include determining the dynamics of the relationship between thoracic (pectoral) and abdominal breathing function reserves and their realization potential during spontaneous breathing, the coordinated spontaneous respiratory movements in terms of thoracic and abdominal components of volumetric, time & rate parameters of spontaneous respiratory cycle, identification of the features of humoral-reflex regulation of breathing by dynamics of ventilation sensitivity of thoracic and abdominal components to chemoreceptor stimuli, etc. Overall, the experiment is intended to provide a better understanding of the basic mechanisms of pulmonary respiration/gas exchange gravitational relations of cosmonauts.]*

Anderson and Yurchikhin continued preparations for EVA-9 by familiarizing themselves with the SAFER (Simplified Aid for EVA Rescue) system, checking out the SAFER units to be used for the spacewalk and also performing checks on the critically important PGTs (Pistol Grip Tools) required for the extravehicular work.

In the SM, Fyodor reconfigured the ESA/Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) by changing the position of its AST spectrometer in the SM (90 deg rotation in its place on panel 437). The activity was photo-recorded, with imagery downlinked afterwards. *[ALTCRISS uses the AST spectrometer to monitor space radiation in the Russian segment (RS).]*

Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the regular check on ongoing US condensate processing for use in the Elektron.

The CDR also did the IMS (Inventory Management System) updating today, editing its standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Anderson worked on the SODF (Station Operations Data File) books, updating them with new procedures pages uplinked and printed out.

Clay also had additional time set aside for prepacking 13A.1 return cargo and transferring it to the Node storage site cleared out earlier.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (CDR, FE-

2), and VELO cycle with bungee cord load trainer (FE-1).

Later tonight, Fyodor will copy the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Yurchikhin collected the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

With the Elektron-VM O<sub>2</sub> (oxygen) generator currently off, cabin air refreshes are being performed from Progress M-59/24P storage (SrPK) as required.

Today's CEO (Crew Earth Observation) photo targets were **Lake Nasser, Toshka Lakes, Egypt** *(the Toshka lakes are a series of unplanned man-made lakes located west of Lake Nasser and the Nile River. Beginning in the late 1990's, an unusual high volume of water began coming down the Nile and was confined and controlled behind the Aswan Dam. The lakes formed when high water in Lake Nasser began spilling westward and filling formerly dry basins in the desert. In recent years the flow of the Nile has diminished and these bodies of water are now drying up. Using this clear, mid-morning pass to continue documentation of this process. Trying for a nadir, west to east mapping of the lakes and central Lake Nasser), Red River Basin, TX* *(the Red River forms much of the border between Texas and Oklahoma. On this midday pass the crew was to help document land use changes by mapping the river channel from near Wichita Falls to Lake Texoma. Weather was expected to be partly cloudy. As ISS passed Oklahoma City the crew was to look just right of track), and Tropical Storm Cosme* *(DYNAMIC EVENT: Tropical Storm Cosme is steadily strengthening in the eastern Pacific midway between Mexico and Hawaii. It should be approaching hurricane strength at the time of this ISS pass. Looking well right of track and trying for broad obliques and pans of the general storm structure).*

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 6:45am EDT [= epoch]):*

Mean altitude -- 332.8 km  
Apogee height -- 338.8 km  
Perigee height -- 326.8 km  
Period -- 91.19 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0008889  
Solar Beta Angle -- 4.2 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in the last 48 hours -- 120 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49555

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/19/07 -- Thruster/reboost test of functionality of new Russian software (vers. 7.05)  
07/23/07 -- US EVA-9 (6:30am EDT)  
07/23/07 -- ISS reboost with Progress 25P  
08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry  
08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks [*under review*]  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch [*to be reviewed*]  
12/13/07 -- (NET) STS-122 undocking

12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/16/07  
**Date:** Monday, July 16, 2007 12:44:54 PM  
**Attachments:**

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**ISS On-Orbit Status 07/16/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 13 of Increment 15.*

CDR Yurchikhin unstowed a DVD disk with the new software vers. 7.05 for the Service Module computer system (SM BVS) and upgraded the SM Central Post Computer 1 (CPC1; Russian: KTSP1) with the software from Laptop 1.

As next step, Yurchikhin worked on transitioning ("ghosting") Laptop 1 itself to vers. 7.05 from DVD, after booting it up on its temporary boot provision.

FE-1 Kotov serviced the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G growth payload, by checking greenhouse humidity and taking the periodic photography of the setup with the Nikon-D1X camera, including the growth of the seeds in the Lada-10 greenhouse. The images were then copied to the RSK1 laptop for subsequent downlink to TsUP-Moscow via BSR-TM channel or OCA. *[Rasteniya researches growth and development of plants under spaceflight conditions in the Lada-10 greenhouse. The regular maintenance of the experiment (generally each Monday, Wednesday, Friday and Sunday) involves monitoring of seedling growth, humidity measurements, moistening of the substrate if necessary, topping off the water tank if ~20-25% of the total amount (4 liters) remains, and photo/video recording. Once weekly, data from the Lada greenhouse control unit are recorded on floppy disk for weekly downlink via REGUL-Packet or the new BSR-TM at a suitable occasion. Experiment purpose is the study of (1) plants cultivation technology, (2) the impact of space flight factors on the growth and evolution of plants which can be potentially used in space vitamin greenhouses, (3) germination & viability of plants, (4) reproductive properties of plants, and production of the second generation of space seeds, (5) chemical composition of plants and seeds grown in zero-g conditions to define the content of nitrocompounds in vegetable biomass, etc.]*

Starting preparations for the crew's EVA-9 Dry-Run on 7/19, FE-2 Anderson worked in the Joint Airlock (A/L), installing first a regenerable METOX (Metal Oxide) canister (#0007, for CO<sub>2</sub> absorption) and an EVA battery (#2007) in EMU (Extravehicular Mobility Unit) #3006, then repeating the process with METOX #0011 and battery #2038 on spacesuit #3008.

Afterwards Anderson set up and started the periodic scrubbing process on the EMU #3008's cooling water loop, by initiating its ionic and particulate filtration. Afterwards, the EMU water processing kit was stowed. *[Purpose of the scrubbing, including iodination of the LCVGs (Liquid Cooling & Ventilation Garments) for biocidal maintenance, is the elimination of any biomass and particulate matter that may have accumulated in the loops.]*

Clay and Fyodor had time reserved for jointly gathering and configuring necessary EVA tools for subsequent readiness stowage in the A/L Crew Lock (CL) compartment.

The crew including FE-1 Kotov, who will serve as IV (Intravehicular) crewmember during the excursion, took a refresher training with the EMU C&W (Caution & Warning) system, using the EMU ECWS (EVA C&W Simulator) application on a laptop. The group also reviewed the use of the EMU Cuff Checklist for malfunction reference.

Oleg Kotov performed the periodic session on the PILLE-MKS experiment, exchanging its Flash memory card. *[With PILLE, the crew records sensor measurements from nine PILLE radiation sensors at nominal exposure locations. Their readings are copied on a regular basis to a PC memory card which must be replaced from time to time.]*

Yurchikhin switched the regenerable two-channel Vozdukh CO<sub>2</sub> scrubber from Mode 5 (manual control) to Mode 1 (automatic cycle control), to let it run in this mode for several hours.

Kotov replaced the current two EDV-ZV water containers used for storing water in the SM's SVO-ZV water supply system with two upgraded EDV-M water containers after filling them.

Using the auditory test equipment, Clay Anderson took the periodic O-OHA (on-orbit hearing assessment) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC (Medical Equipment Computer) laptop application. This was Clay's second test, since 6/22. Oleg Kotov and Fyodor Yurchikhin performed the test on 7/6.

*[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month. Note: There have been temporary hearing deficits documented on some U.S. and Russian crewmembers, all of which recovered to pre-mission levels.]*

Anderson performed the regular monthly & quarterly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), inspecting the condition of harnesses, belt slats, corner bracket ropes, IRBAs (Isolation Restorative Bungee Assemblies) and gyroscope wire ropes for any damage or defects, lubricating as required plus recording time & date values. *[This task was deferred from 7/12.]*

Clay also completed the periodic CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout on the prime unit (#1060) and backup unit (#1057). *[Clay changed out the prime unit's battery, then zero-calibrated both instruments. Following zero calibration, the backup unit was stowed, while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

Later, the FE-2 had additional time set aside for prepacking 13A.1 return cargo and transferring it to the Node storage site cleared out earlier.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Clay will copy the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

With the Elektron-VM O<sub>2</sub> (oxygen) generator currently off, cabin air refreshes are being performed from Progress M-59/24P storage (SrPK) as required.

Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the regular check on ongoing US condensate processing for use in the Elektron.

Oleg did the IMS (Inventory Management System) updating today, editing its standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

At ~8:40am EDT, Oleg had his weekly PFC (Private Family Conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC8 laptop).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:01am EDT [= epoch]*):

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Perigee height -- 327.1 km

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Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008723

Solar Beta Angle -- -0.1 deg (magnitude bottoming out)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in the last 48 hours -- 132 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49540

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/20/07 -- Thruster/reboost test of functionality of new Russian software (vers. 7.05)

07/23/07 -- US EVA-9 (6:30am EDT)

07/23/07 -- ISS reboost with Progress 25P

08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry

08/02/07 -- Progress M-61/26P launch

08/05/07 -- Progress M-61/26P docking (DC1 nadir)

08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
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04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
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04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/15/07  
**Date:** Sunday, July 15, 2007 11:12:07 AM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

### **ISS On-Orbit Status 07/15/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Clay Anderson). Ahead: Week 13 of Increment 15.*

FE-2 Anderson continued his current (first) seven-day SLEEP experiment by accessing the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

Anderson also completed the standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, using his DCS-760 digital still camera with 400 & 800mm lenses at SM windows 6 & 8 to take imagery of documented CEO Earth targets using manual focusing only. Later (~8:20am EDT), Clay downlinked the obtained OBT images to the ground for analysis. The skill training prepares the crew for the bottom side mapping of the Orbiter at the arrival of STS-118/13A.1. *[During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Endeavour, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

As part of their physical fitness program today, both Yurchikhin and Kotov also spent ~1.5 hrs wearing the Russian PZE STIMUL-01 suit for physical stimulation/conditioning training with the freshly charged batteries. *[The STIMUL-01 neuromuscular myostimulator suit uses electrical stimulation for rhythmic contraction and relaxation of body muscle fibers for conditioning. It is part of the suite of BMS (Biomedical Support) systems under development at IBMP (Institute for Biomedical Problems) in Moscow for long-duration spaceflights including piloted Mars missions.]*

With the Elektron-VM O<sub>2</sub> (oxygen) generator currently off, cabin air refreshes are being performed from Progress M-59/24P storage (SrPK) as required, using up its O<sub>2</sub> stores before undocking on 8/1.

From their discretionary “time permitting” task list, Oleg and Fyodor today worked another two Uragan/Diatomeya earth & ocean observation sessions.

After attitude control handover to Russian MCS (Motion Control System) thrusters at 11:50pm EDT last night, the ISS maneuvered to the desired attitude at 11:55pm in support of the Russian SM Solar Array Efficiency test, which took place until about midnight. The ISS then maneuvered back to +XVV (X-axis in Velocity Vector), and attitude control authority was returned to U.S. momentum management with CMGs at approximately 3:05am.

Clay Anderson received rave kudos from the Principal Investigator for his “Saturday Science” session with CFE-VG1 yesterday.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
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Perigee height -- 327.2 km  
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Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0008704  
Solar Beta Angle -- -4.2 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in the last 48 hours -- 124 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49524

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/15/07 -- FGB Solar Array Efficiency Test  
07/20/07 -- Thruster/reboost test of functionality of new Russian software (vers. 7.05)  
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07/23/07 -- ISS reboost with Progress 25P  
08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry  
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10/20/07 -- (NET) STS-120/Discovery/10A docking  
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12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch [*to be reviewed*]  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/14/07  
**Date:** Saturday, July 14, 2007 4:44:24 PM  
**Attachments:**

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**ISS On-Orbit Status 07/14/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 15 crew CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Clay Anderson, except for regular maintenance & voluntary work. Bastille Day -- France's great national holiday.*

FE-2 Anderson continued his current (first) seven-day SLEEP experiment by accessing the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

FE-2 Anderson finished the second session for Inc-15 (and the 27<sup>th</sup> aboard ISS) of the EarthKAM (Earth Knowledge Acquired by Middle School Students) experiment from the University of California in San Diego, by disassembling and stowing the hardware. *[EarthKAM was activated on 7/9 to continue getting students interested in math and science and to inspire this next generation of explorers. A problem with the Kodak ESC 460C electronic still camera necessitated earlier termination of the session.]*

Oleg initiated the discharge on the second of two NiMH (Nickel Metal Hydride) batteries for the Russian BMD (Biomedical Device) PZE STIMUL-01 payload in the payload's charger device battery in preparation for the upcoming physical stimulation/conditioning training of the two cosmonauts with the device. *[The neuromuscular myostimulator suit STIMUL-1, which uses electrical stimulation to contract and relax leg muscle fibers for conditioning, is part of the suite of BMS (Biomedical Support) systems under development at the Moscow IBMP (Institute for Biomedical Problems) for long-duration spaceflights including piloted Mars missions.]*

With the Elektron-VM O<sub>2</sub> (oxygen) generator currently off, cabin air refreshes are being performed from Progress M-59/24P storage (SrPK) as required.

Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Oleg also did the IMS (Inventory Management System) updating today, editing its standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

For today's "Saturday Science" program, Clay Anderson conducted the CFE VG1 (Capillary Flow Experiment – Vane Gap 1) experiment. *[Overall objective: Study critical geometric wetting phenomena important for the design of capillary fluid systems aboard spacecraft.]*

Anderson filled out the regular FFQ (Food Frequency Questionnaire), his third, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

At ~9:40am EDT, the crew conducted their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill

(CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Clay will copy the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Yurchikhin and Anderson had their weekly PFCs (Private Family Conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop), Fyodor at ~6:30am EDT, Clay at ~10:14am.

At ~8:00am, the crew had a private telecon with the NASA Associate Administrator for Space Operations, William Gerstenmaier.

Still on the Russian "time permitting" task list for Kotov and Yurchikhin remains equipment auditing/inventorying in the RS.

Also from the discretionary task list, Oleg and Fyodor today worked another Uragan earth-observation session, took ECON earth photography, and serviced the MATRYOSKA-R radiation payload, with data recording from the Lulin-5 electronics box and calldown.

**OGS Update:** Activation of the Oxygen Generation System (OGS) began on 7/11 by venting the hydrogen dome down to near vacuum which is maintained during operations. The process to evacuate the dome took several hours, which was indicative of ice formation. Subsequent shutdowns occurred during the attempts to complete the transition to standby due to low water levels. Once the OGA (Oxygen Generation Assembly) finally reached Process mode, it operated at 25% for a few hours to make sure that any transient values settled out, then was moded to 50% for about 20 minutes, then 75% for 20 minutes and finally up to 100% mode. Since only a minimal amount of water was available, operation could run at 100% mode for just 13 hours, at which time the OGA was deactivated. There will be one more crew activity scheduled in support of OGA deactivation which will configure rack connections for extended deactivation. The next planned OGA operation will be in approximately 90 days.

### **Weekly Science Update** (*Expedition Fifteen -- 12<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Next ALTEINO rotation is currently scheduled on 7/17, Subsequent data dump is scheduled on 7/18.

*ANITA*: Planned.

*BCAT (Binary Colloidal Alloy Test)*: Reserve.

*CARDIOCOG-2*: Continuing.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS)*:  
Continuing,

*CFE (Capillary Flow Experiment)*: Reserve.

*CHROMOSOME-2 (E14 SFP)*: Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus)*: In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2)*: In support for BCAT-3 only.

*EarthKAM (Earth Knowledge Acquired by Middle School Students)*: Complete.

*EMCH (Elastic Memory Composite Hinge)*: Complete.

*EPO (Educational Payload Operation) Kit C*: Planned.

*IMMUNO (Saliva Sampling)*: First session currently scheduled between 7/25 & 7/25.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*:  
Complete.

*MISSE (Materials ISS Experiment)*: Ongoing.

*MTR-2 (Russian radiation measurements)*: Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1*: Planned

*MUSCLE (E14 SFP)*: Completed.

*MSG-SAME (Microgravity Science Glovebox)*: Planned.

*NEOCYTOLYSIS (E14 SFP)*: Completed.

NOA-2 (*Nitric Oxide Analyzer*): Planned.

NUTRITION: *Planned.*

SAMPLE: *Ongoing.*

SAMS/MAMS (*Space & Microgravity Acceleration Measurement Systems*):  
Ongoing.

SLEEP (*Sleep-Wake Actigraphy & Light Exposure during Spaceflight*): Clay has completed his first scheduled week of SLEEP logs. He will have two more weeks scheduled after this is complete. Next week he will have his second SLEEP Actiwatch download session.

SPHERES (*Synchronized Position Hold, Engage, Reorient, Experimental Satellite*):  
Planned.

Swab (*Characterization of Microorganisms & Allergens in Spacecraft*): In progress.

TRAC (*Test of Reaction & Adaptation Capabilities*): Planned.

CEO (*Crew Earth Observations*): Through 7/9 the ground has received a total of 7,337 CEO images for review and cataloging for Increment 15. CEO daylight orbit tracks are now rapidly shifting southward where light is lower, the Southern Hemisphere winter is in full swing, and targets are fewer and more challenging to acquire. An Expedition 15 image of the Great Salt Lake of northern Utah, acquired in late April, will be published on NASA/GSFC's Earth Observatory website this weekend. The view nicely illustrates the sharp color variation caused by red algae in the north arm of the lake where water impoundment by a railroad causeway has nearly doubled the salinity there when compared to the rest of the lake. We look forward to receiving feedback from you on what targets you are acquiring and if there is any further assistance we can provide."

Today's CEO (Crew Earth Observation) photo targets were **Nile River Delta** (*the large delta of the Nile dominates the Mediterranean coast of Egypt. The crew had a nadir pass at midday in fair weather. As ISS approached the coast from the NW, the crew was to find the city of Alexandria on the west side of the delta and acquire a detailed mapping strip of the coastal margins only, eastward to Port Said on the Suez Canal*), **Mt. Kilimanjaro, Tanzania** (*this famous volcanic peak is an east African landmark located in the northeast of Tanzania near the border with Kenya. ISS approach this pass was from the NW in the early afternoon with at least partly cloudy conditions expected. Finding Lake Victoria on left and continuing looking left*

*of track for the small ice fields and glaciers of this 5200 m high peak. CEO needs detailed views of these features to document their predicted retreat and disappearance in this century), and **Kwanza Basin** (this target area is located in extreme northwestern Angola to the northeast of the capital city of Luanda. The interest in this rural site is to document rapid change. While most of Africa stagnates economically, extraction of Angola's huge hydrocarbon reserves has started to spark economic development in diverse places. In the Kwanza basin all kinds of infrastructure is planned, so that present patterns of natural vegetation, animal migration routes and human settlement will all change. As ISS approached the lower Congo River from the NW, the crew was to begin a mapping pass to the right of track. They had mid-afternoon light with fair weather expected. Using a short lens setting for just regional context views this time).*

CEO photography can be viewed and studied at the websites:

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Eccentricity -- 0.0008844

Solar Beta Angle -- -8.1 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in the last 48 hours -- 137 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49508

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07/23/07 -- US EVA-9 (6:30am EDT)

07/23/07 -- ISS reboost with Progress 25P

08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry

08/02/07 -- Progress M-61/26P launch

08/05/07 -- Progress M-61/26P docking (DC1 nadir)

08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)

08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch S  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/13/07  
**Date:** Friday, July 13, 2007 1:29:47 PM  
**Attachments:**

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### **ISS On-Orbit Status 07/13/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-2 Anderson continued his current (first) seven-day SLEEP experiment by accessing the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

The three crewmembers performed the Russian biomedical routine assessments of PZeh-MO-7/Calf Volume Measurement and PZeh-MO-8/Body Mass Measurement (fifth time for CDR & FE-1, second for FE-2), using the IM mass measurement device which Oleg Kotov afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference pints, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

CDR Yurchikhin deactivated the #1 lane of the Russian TsVM Central Computer (command) and the #2 lane of the TVM2 Terminal Computer (navigation). *[The two lanes got their connecting jumpers installed yesterday and were left up and running overnight to verify their functionality.]*

The FE-1 assisted the ground in deactivating the Elektron oxygen (O<sub>2</sub>) generator, after purging its BZh Liquid Unit with nitrogen (N<sub>2</sub>) at 0.65 kg/cm<sup>2</sup> via its KE3 and VN3 valves. This was necessary for the subsequent demating of the BITS2-12 onboard measurement telemetry system and VD-SU control mode, required for the following electronic parts R&Rs (Removal & Replacements). *[Elektron purging is required by Flight Rule if the system is scheduled to be off for more than 12 hours,]*

After the BITS2-12 and VD-SU were turned off, Kotov and CDR Yurchikhin installed a new TA250 temperature sensor in the container with the BITS LKTs devices (local digital commutators/switches) on the faulty LKTs2B36 unit. *[The repair required the temporary dismantling of the LIV video camera system behind panel 426.]*

Afterwards, Oleg Kotov also removed and replaced the fan (MTs12-4) in the BMP Harmful Impurities Removal System after checking seals and gasket. BITS and VD-SU were then reconnected and turned on again by the ground, which automatically activated the BMP.

A major activity of FE-2 Anderson today was the upgrading of the receiver/processor of SIGI-2 (Space Integrated GPS/Inertial Navigation System 2) at the Lab's AV-3 (Avionics 3) rack with new R3 firmware, approved yesterday by the IMMT (ISS Mission Management Team). *[Upgrading the SIGI-1 firmware load will be more time-consuming since GPS-1 is located in the Lab's aft starboard endcone, which requires rotating the S6 rack for the MT TCS/CCAA (Moderate Temperature/Thermal Control System/Common Cabin Air Assembly) away from the wall, and perhaps also the D6 rack for a possible AAA (avionics air assembly) inspection.]*

Anderson also performed the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[Purpose of the 10-min. activity is to correlate the hand-held readings with MCA (Major Constituents Analyzer) measurements. Two CSA-CP (CSA-Combustion Products) instruments recorded O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post (#1057, prime) and in the Node (#1060, backup), while the CSA-O<sub>2</sub> units (#1056, #1059) looked for O<sub>2</sub> in the Lab and the CDMK (#1007) for CO<sub>2</sub> in SM and Lab. Also recorded were battery ticks. The instruments were turned off afterwards, except for the prime CSA-CP #1057 unit, and returned to their regular locations.]*

The crew reviewed the current procedures/timeline for EVA-9, scheduled on 7/23

(Monday) and afterwards tagged up with ground specialists to discuss the spacewalk. *[EVA-9, expected to start 6:30am EDT on 7/23, will last approximately 6.5 hrs and will be conducted by Anderson (EV1) and Yurchikhin (EV2). Its major objectives are to - (1) install a video stanchion at CP-7 (Camera Position 7) on the S0/P1 truss interface, from the VSSA (Video Stanchion Support Assembly); (2) reconfigure power connections at the SASA (S-band Antenna Support Assembly) on the S1 truss; (3) remove & replace the failed RPCM (Remote Power Controller Module) S04B\_F on the S0 truss and return old RPCM to A/L (Airlock); (4) install an APFR (Articulated Portable Foot Restraint) on the SSRMS (Space Station Remote Manipulator System); (5) EV1 ingress APFR, maneuver to jettison position & jettison the integrated VSSA FSE (Flight Support Equipment) and EFRAM (EVA Flight-Releasable Attachment Mechanism) in retrograde direction; (6) release & jettison the EAS (Early Ammonia Servicer, mass ~1400 lbs); (7) egress SSRMS and translate to Node nadir port; (8) perform CBM (Common Berthing Mechanism) cleaning at Node nadir port (for PMA-3); (9) clean up (return APFR to External Stowage Platform 2) and ingress A/L. Possible get-ahead tasks would be removal of GPS antenna #4 and relocation of an auxiliary bag from P6 to Z1. **Note:** The timeline outlined in yesterday's On-Orbit Report was inadvertently taken from plans for EVA-4 during STS-118/13A.1 docked period.]*

Oleg initiated discharge/charge cycle on the first of two NiMH (Nickel Metal Hydride) batteries for the Russian BMD (Biomedical Device) PZE STIMUL-01 payload in the payload's charger device battery in preparation for the upcoming physical stimulation/conditioning training of the two cosmonauts with the device. *[The neuromuscular myostimulator suit STIMUL-1, which uses electrical stimulation to contract and relax leg muscle fibers for conditioning, is part of the suite of BMS (Biomedical Support) systems under development at the Moscow IBMP (Institute for Biomedical Problems) for long-duration spaceflights including piloted Mars missions.]*

Oleg continued gathering and transferring excessed equipment and trash to the Progress 24P at the DC1 nadir port, scheduled for jettisoning on 8/1.

Clay is to do the regular bi-weekly maintenance reboot of the SSC (Station Support Computer) OCA Comm Router laptop.

Anderson and Kotov were to locate a "missing" bag with logistics item for the MELFI (Minus-Eighty Laboratory Freezer for ISS).

Kotov performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Oleg also did the IMS (Inventory Management System) updating today, editing its standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

At ~4:35am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow. *[Point of discussion was the crew's desire for GOGU to schedule back-up activities which can be executed in the crew's spare time.]*

At ~6:30am, Fyodor and Oleg linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Discussions today concerned the stowage situation of Progress M-60/25P and its correct listing in the IMS database, as well as stowage locations for SVO water supply equipment shown for the SM.]*

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio is timelined later at ~4:20pm.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-1, FE-2), TVIS treadmill (CDR), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Clay will copy the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Still on the Russian "time permitting" task list for Kotov and Yurchikhin remains equipment auditing/inventorying in the RS.

A second job added to the CDR's discretionary task list concerns photo/video documenting of the RS interior and available stowage areas to support planning efforts by ground specialists.

*OGS Update:* After working through several issues yesterday, mostly related to water accumulator quantity and pressure, Oxygen Generation System (OGS) ops became nominal overnight and began producing O<sub>2</sub> at the 25% mode. Production was then "ramped up" in 25%-steps and reached 100% earlier this morning, with nominal performance. For the crew, O<sub>2</sub> production is indicated by the noise of frequent cycling of the WDS (Water Delivery System) pump. Because of the

delays, Clay Anderson's deactivation activity scheduled today has been deferred and will be rescheduled sometime in the next two weeks.

*EarthKAM Update:* EarthKAM encountered an error situation within the camera which required early termination of the session. Teardown of the equipment is still scheduled for tomorrow.

*Saturday Science Update:* For tomorrow's "Saturday Science" program, Clay has selected CFE VG1 (Capillary Flow Experiment – Vane Gap 1). *[Overall objective: Study critical geometric wetting phenomena important for the design of capillary fluid systems aboard spacecraft.]*

*Correction:* The TVIS Monthly/Quarterly Inspection and ELITE-S2 stowage preparations reported for yesterday were aborted due to the AAA filter activity running long. These tasks will be rescheduled (ELITE-S2 on 7/16).

Today's CEO (Crew Earth Observation) photo targets were **Spider Impact Crater** (*this 570 million year old impact is near the western edge of the Kimberly Plateau of Western Australia. On this pass, ISS approach was from the NW in afternoon sun under clear skies. As it crossed the coast, the crew was to begin looking for this distinct, spider-shaped feature just right of track. It is about 13km in diameter*), **Etna Volcano, Italy** (*DYNAMIC EVENT: This famous, landmark volcanic mountain located in northeastern Sicily has been erupting intermittently now for months. As ISS tracked from the NW near the big island of Sardinia, the crew was to look for Sicily and the volcanic summit near the far eastern end. The pass was in late morning sun and fair weather was expected*), and **Coast Mountains** (*these ranges in western British Columbia are a northern extension of the Cascade Ranges in the US. However the higher latitude and plentiful snowfall here support a number of small ice fields and numerous valley glaciers, many of which are now in rapid retreat. In this partly cloudy, late morning pass, the crew was to try for near-nadir views of the larger ice fields and glaciers that they could map in detail*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:03am EDT [= epoch]*):

Mean altitude -- 333.3 km

Apogee height – 339.1 km

Perigee height -- 327.5 km

Period -- 91.20 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0008703  
Solar Beta Angle -- -11.8 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in the last 48 hours -- 150 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49492

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/15/07 -- FGB Solar Array Efficiency Test  
07/20/07 -- Thruster/reboost test of functionality of new Russian software (vers. 7.05)  
07/23/07 -- US EVA-9 (~11:00am EDT, est.)  
07/23/07 -- ISS reboost with Progress 25P  
08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry  
08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks *[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)

??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch S  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/12/07  
**Date:** Thursday, July 12, 2007 1:05:25 PM  
**Attachments:**

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**ISS On-Orbit Status 07/12/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-2 Anderson continued his current (first) seven-day sleep monitoring experiment by accessing the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

For tomorrow's scheduled R&R (removal & replacement) of the fan (MTs12-4) of the Russian Segment's Micropurification System (RS BMP), FE-1 Kotov unstowed the new fan unit for pre-install inspection (e.g., function of its automatic switch) and gathered the necessary tools.

CDR Yurchikhin set up the Russian biomedical "Pilot" experiment (MBI-15), which requires a table, ankle restraint system, electrodes, and two hand controllers (RUP) for testing piloting skill in "flying" simulations on a laptop (RSK1) under stopwatch control. He then conducted the experiment for the first time this Increment, supported by tagup with ground specialists via S-band. The Pilot-SMP-P gear was left in place, to be used by FE-1 Kotov next week (7/17). *[Fyodor had to perform three flight control modes (fixed, slow and fast free-flyer), each one at least five times, after checkout and calibration of the control handles. MBI-15 was done the last time by Tyurin, Lopez-Alegria and Kotov during the joint E14/E15 period in April 2007.]*

FE-2 Anderson supported the CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus) payload activity by retrieving the Science Insert

from CGBA-4 and inserting it in CGBA-2. *[CGBA-4 was powered off by the ground before the removal. CGBA-2 was returned to the EXPRESS rack unpowered, and the CGBA-4 bioprocessor was powered back on by the ground.]*

Continuing the ongoing troubleshooting on the RS TVM (Terminal) & TsVM (Central) computers preparatory to the planned activation of all six lanes on 7/16 (and testing on 7/17), CDR Yurchikhin installed bypass jumper cables in the two remaining subsets TsVM1 and TVM2. For checking their function, two Service Module (SM) telemetry channels will be activated later today (SS1, TS2), to operate until early tomorrow morning.

Anderson undertook the monthly FDS PEP (Fire Detection & Suppression/Portable Emergency Provisions) safety inspection/audit. *[The IMS (Inventory Management System)-supported inspection involves verification that PFEs (portable fire extinguishers), PBAs (portable breathing apparatus), QDMAs (quick-don mask assemblies) and EHTKs (extension hose/tee kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware. In the U.S. segment (USOS), there are a total of 5 PFEs and 7 PBAs, plus 7 QDMAs and 4 EHTKs. In the Node, Suni makes sure that no more than three PBA bottles are stowed in the locker, to reduce the risk of getting too much oxygen concentration inside the stowage area in case of bottle leakage. ]*

Continuing the current round of monthly preventive maintenance of RS ventilation systems, Oleg Kotov cleaned the four "Group B" fan screens (VT1, VTK1, VV1RO & VV2RO) in the SM.

In preparation for repair work on the RS BITS2-12 onboard measurement telemetry system scheduled tomorrow, Yurchikhin gathered and readied repair tools and the new TA250 sensor unit to be installed in the container with the BITS LKTs (local digital commutators/switches). *[The repair will be performed on the faulty LKTs2B36 device, requiring the temporary dismantling of the LIV video camera system behind panel 426.]*

Clay Anderson had 90 min reserved for accessing the AAA (Avionics Air Assembly) in the CHeCS (Crew Health Care Systems) rack to inspect and clean the fan filter inlet and plenum orifices, using the vacuum cleaner as necessary, and to check the smoke detector for FOD (foreign object debris). *[To get at the work site, the CMRS (Crew Medical Restraint System) board had to be removed and temporarily stowed before Clay, with Oleg assisting, could rotate the CHeCS rack for opening, and working behind, the rear panels.]*

Kotov completed the third-day microbial sampling activity with the Russian SZM-MO-21 "Ecosfera" experiment, inspecting and assessing bacteria colonies grown on

“Medium 2” Petri dishes since 7/3. An earlier sample assessment, on “Medium 1”, was performed on 7/5. *[The equipment, which includes an air sampler set, a charger, power supply unit, and incubation tray for Petri dishes, determines microbial contamination of the ISS atmosphere, specifically the total bacterial and fungal microflora counts and microflora composition according to morphologic criteria of microorganism colonies.]*

Afterwards, the FE-1 also collected the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

The CDR had an hour set aside for the long-term task of network & computer hardware auditing and storage optimization in the RS. *[The on-going inventorying and stowage reshuffling activity, with progress reported down from time to time, is focused on plugged-in laptops and their accessories including power supplies (Laptops RSK1, RSE1, RSE-Med, RSS1, RSS2, and TP2), as well as assorted computer equipment in stowage bags,]*

Clay performed the scheduled lens change on the EarthKAM system at the Lab science window, going from 50mm to 180mm focal length. The lens change had to be performed on the night side while EarthKAM was not taking pictures. *[EarthKAM was activated on 7/9, and the current session is the 27<sup>th</sup> time aboard the ISS and the second time on Increment 15. The payload runs without crew intervention through Saturday (7/14). EK is using a Kodak ESC 460C electronic still camera with 50mm and 180mm lenses, powered by 16Vdc from a 28 Vdc adapter, taking pictures by remote operation from the ground, without crew interaction. It is available for students who submit image requests and conduct geographic research (student participants include over 84 teachers who are being trained to use EK). The requests are uplinked in a camera control file to the ThinkPad A31p laptop which then activates the camera at specified times and receives the digital images from the camera’s storage card on its hard drive, for subsequent downlink via OpsLAN. The current session has encountered two “hiccups”, one with the image-storage server at JSC (no images lost, just delay), the other with a disconnected Firewire cable on board that was discovered by the crew only after 167 images were not recorded. So far, 535 images have been downlinked for the students. ]*

Yurchikhin had another hour reserved for more connector continuity checks on the faulty (partially corroded) BOK-3 Command Processing Unit of the TVM (Terminal) & TsVM (Central) computers, using the “Elektronika MMTs-01” MultiMeter for the resistance measurements.

Anderson worked on ER5 (EXPRESS Rack #5), relocating items stored in Drawer 2 to make room for the ELITE-S2 payload hardware arriving with 13A.1. *[The Italian (ASI) experiment ELITE-S2 (Elaboratore Immagini Televisive - Space 2) is a human motion analysis facility for technological characterization and potential application for multifactorial movement analysis, to study the connection between brain, visualization and motion in micro-G. By recording and analyzing the three-dimensional motion of astronauts, this study should help engineers apply ergonomics into future spacecraft designs and determine the effects of weightlessness on breathing mechanisms for long-duration missions.]*

Clay conducted the weekly 10-min CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card, to be updated with today's data, lists 26 water containers (~1001 liters total) for the four types of water identified on board: technical water (694 l, for Elektron, flushing, hygiene), potable water (265.1 l), condensate water, waste and other. The potable water transferred from the Shuttle is has been cleared for use after analysis of samples returned to Earth on the last Shuttle.]*

With all US trash gathering for Progress M-59/24P considered complete, FE-1 Kotov had another three hours to collect and stow RS (Russian segment) excessed hardware and waste on the 24P cargo ship, to be jettisoned on 8/1.

In preparation for tomorrow's planned procedures review by the crew and tagup with specialists for the next US spacewalk, EVA-9, Anderson printed out briefing material uplinked overnight by MCC-H. *[EVA-9, expected to start ~11:00am EDT on 7/23, will last approximately 6.5 hrs. Its major objectives are: (1) installation of the OBSS (Outboard Boom Stand System) at the S1 truss (zenith outboard trunnion); (2) removal of the failed GPS antenna #4 on the S0 truss (nadir inboard); (3) relocation of an auxiliary bag from the P6 truss (starboard forward nadir) to the Z1 truss (forward, "wagon wheel" nadir); (4) removal and replacement of handrails at the EWIS (External Wireless Instrumentation System) antenna on the Lab forward end (nadir), plus rewiring; (5) cleaning up the previous installation of the Lab H<sub>2</sub> vent MMOD (Micrometeoroid/Orbital Debris) shield; (6) cleaning up the previous installation of the Node LAN cabling MMOD (Micrometeoroid/Orbital Debris) shield; and (7) installation of a WETA (Wireless Video System External Transceiver Assembly) antenna on a stanchion at the S3 truss.]*

Fyodor performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities

systems/replaceables.

Oleg handled the IMS updating today, editing its standard “delta file” for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Clay performed the regular monthly & quarterly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), inspecting the condition of harnesses, belt slats, corner bracket ropes, IRBAs (Isolation Restorative Bungee Assemblies) and gyroscope wire ropes for any damage or defects, lubricating as required plus recording time & date values.

Still on the Russian “time permitting” task list for Kotov and Yurchikhin remains equipment auditing/inventorying in the RS.

A second job added to the CDR’s discretionary task list for today was photo/video documenting of the RS interior and available stowage areas to support planning efforts by ground specialists.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Clay will copy the crew’s exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~12:45pm EDT, the FE-2 set up the SM's Kenwood amateur radio equipment for a ham session at 12:50pm with students gathered at the Manitoba Space Adventure Camp at the Canadian Air Force 17 Wing in Winnipeg, Manitoba/Canada. *[The goal of the Manitoba Space Adventure Camp by the Maples Collegiate is to introduce Manitoba high school students to a variety of aerospace-related subjects and activities to increase their awareness, appreciation, and motivation for science and technology in Manitoba. Questions to Clay were uplinked beforehand. “How do you ensure that all your software, technology, and equipment are compatible with each other even though they are made by different countries?”; “How will the space station be sustained after the shuttle is retired in 2010?”; “How important do you believe the occupation of space will be in the future?”...]*

*OGS Update:* Activation of the Oxygen Generation System (OGS) by ground

controllers continues, with several shutdowns slowing down progress, not unusual in first-time activation of such a complex system, which involves a learning process. Yesterday, during the activation the H<sub>2</sub> dome the absolute pressure sensor indicated pressure decay, i.e., an indication that an internal valve was leaking. Activation was temporarily halted until ground controllers performed troubleshooting procedures to clear any possible FOD (Foreign Object Debris) from the suspect valve. This cleared up the issue. Later, procedures were delayed due to the level of moisture freezing in the dome vent line which was greater than expected. Another shutdown was caused by an off-nominal flow rate measurement. Activation activities are continuing today.

*Russian Software Transition Update:* RS SM 7.05 software upgrade is continuing. The issue with KTSP1 (Central Post Computer #1) was resolved satisfactorily, and both CPCs are running nominally. On 7/16, the two GNC (Guidance, Navigation & Control) computers TVM (Terminal) & TsVM (Central) will be restarted on all six lanes (with jumpers) with context data, followed by testing of all six processor channels on 7/17. On 7/18, SM 7.05 will be uploaded to TVM & TsVM, to be checked for functionality in the planned Progress 25P firing test on 7/20. The main ISS reboost is then scheduled for 7/23, shortly after EVA-9.

*Russian KURS Update:* TsUP/Moscow performed another readiness test on the KURS automated approach & docking system on both strings. There were no issues.

*Russian SKV1 Update:* After yesterday's recharging of the SKV1 air conditioner's coolant supply with Khladon-218 (Freon-218), the unit ran nominally for 12 hrs, then shut down due to over-cooling. Further testing is being planned as part of planned testing of loop #2 (KOB-2) of the RS thermal control system.

*Progress Prop Transfer Update:* In preparation for 24P undocking, ~67 kg fuel (UDMH/unsymmetrical dimethyl hydrazine) and ~102 kg oxidizer (N<sub>2</sub>O<sub>4</sub>/nitrogen tetroxide) propellants were transferred yesterday from the cargo drone storage to the FGB high-pressure fuel & oxidizer tanks (BVDG, BVDO). Approximately 270 kg of propellant remain in the second section of Progress 24P tanks (230 kg are needed for vehicle deorbiting, leaving 40 kg for attitude control).

Today's CEO (Crew Earth Observation) photo targets were **Lahore, Pakistan** (*this teeming city of over 8 million people is located in the northeastern edge of the Indus River Valley near the border with India. ISS approach was from the NW. As ISS passed the Hindu Kush and began crossing the SW-ward flowing streams of the Indus River Valley, the crew was to look just near nadir for Lahore and attempt a long-lens mapping of details of the urban margins. The pass was expected to be in*

*fair weather with early afternoon sun and some smog likely), **Cairo, Egypt** (the Egyptian capital is a sprawling urban area situated at the apex of the lush, agricultural area of the Nile River Delta. On this early afternoon pass, the crew should have had clear skies and a nadir view of the city below. As with other cities, trying to map in detail the edges of the urban area, particularly the eastern and southern quadrants), **Coast Mountains** (these ranges or western British Columbia are a northern extension of the Cascade Ranges in the US. However the higher latitude and plentiful snowfall here support a number of small ice fields and numerous valley glaciers, many of which are now in rapid retreat. In this fair-weather early morning pass, the crew was to try for near-nadir views of the larger ice fields and glaciers that they could map in detail), **Mullan-Buffalo** (this target area consists roughly of the upper Missouri River valley from east of Flathead Lake to west of Fort Peck Lake in north central Montana. The focus of this target is educational outreach for historical sites and pioneer trails. The pass was near nadir with clear weather expected in late morning sun. Trying for a west to east mapping pass along the river between Flathead and Fort Peck Lakes), and **Florida Coastal Everglades** (the Florida Everglades is a vast wetlands area occupying much of the State of Florida south of Lake Okeechobee. The pass was in early afternoon and only a few scattered clouds were expected. The crew had a near nadir pass over the SE and southern coast. Mapping in detail the coast from just S of Miami S and W-ward to Cape Sable).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:07am EDT [= epoch]*):

Mean altitude -- 333.4 km

Apogee height -- 339.3 km

Perigee height -- 327.6 km

Period -- 91.20 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008681

Solar Beta Angle -- -15.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in the last 48 hours -- 90 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49477

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/15/07 -- FGB Solar Array Efficiency Test

07/20/07 -- Thruster/reboost test of functionality of new Russian software (vers. 7.05)  
07/23/07 -- US EVA-9 (~11:00am EDT, est.)  
07/23/07 -- ISS reboost with Progress 25P  
08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry  
08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks *[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking

04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/11/07  
**Date:** Wednesday, July 11, 2007 2:33:42 PM  
**Attachments:**

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### **ISS On-Orbit Status 07/11/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-2 Anderson continued his current (first) seven-day SLEEP experiment by accessing the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

FE-2 Anderson supported the ongoing activation of the new OGS (Oxygen Generation System) in the US Lab by installing an H<sub>2</sub> (hydrogen) sensor and configuring the OGS rack. Subsequent activities are being performed via S-band/telemetry commanding from the ground: powering up the rack, configuring the software and testing the watchdog timer, followed by several hours of activation and checkout. *[Activities came to a temporary halt early in the checkout when the pressure sensor indicated decreasing H<sub>2</sub> dome pressure, i.e., a small leak probably due to debris in the external vent valve. Activation proceeded nominally when the dome had passed a 20-min leak test after recycling the new H<sub>2</sub> vent valve.]*

CDR Yurchikhin worked on the Russian SKV1 air conditioner, recharging its coolant supply with Khladon-218 (Freon-218) from a storage container, followed by interface leak checks using a foaming compound (POS). *[SKV2 was turned off for the activity, and a smoke detector was temporarily removed to provide access to a panel, later re-installed.]*

Anderson relocated non-13A.1 equipment in the Node from its ZSR (Zero-G

Stowage Rack) stowage to make room on the rack for staging 13A.1 prepacked hardware. Later, Clay had another 90 min for gathering and prepacking cargo for 13A.1 return. *[The cleanup was intended to reduce the amount of non-return items at the Node location and alleviate confusion during 13A.1 transfer operations. Items remaining on the rack include return bags, empty CTBs (Cargo Transfer Bags), and some panels.]*

Using the vacuum cleaner and other tools, the FE-2 performed the periodic one-hour US segment (USOS) hatch seal inspection (Node forward, aft & starboard, Lab aft, Airlock IV hatch) in support of ACS (Atmospheric Control System) maintenance (last time done: 4/19/07).

With all trash gathering for Progress M-59/24P considered complete on the US side, FE-1 Kotov had his two-hour turn to collect and stow RS (Russian segment) excess hardware and waste on the 24P cargo ship, to be jettisoned on 8/1.

Also in preparation for the 24P undocking, TsUP/Moscow had scheduled for today the transfer of the ship's stored fuel & oxidizer propellants, executed by the Service Module (SM)'s automated daily timeline sequencer (SPP). *[The automated refueling procedure transferred propellants from the 24P SD (refueling system) tanks to the FGB high-pressure fuel & oxidizer tanks (BVDG, BVDO), followed by the transfer of the fuel remaining in the Progress' KDU propulsion section/tanks.]*

Yurchikhin and Kotov worked two hours on the periodic maintenance of the smoke detection system in the FGB, replacing a fuse in the control unit and replacing all ten IDZ-2 smoke detectors with new spares.

To prepare the failed BOK-3 Command Processing Unit of the TVM (Terminal) & TsVVM (Central) computers for 13A.1 return to Earth, Yurchikhin opened access panels in the SM and demated the cabling of the unit, capping the demated connectors with tape for protection and securing the cable bundle. *[On 7/3, Fyodor had taken photographs of the BOK-3 cabling to assist the ground in determining replacement needs.]*

The CDR also performed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water collected in CWCs from the Lab CCAA (Common Cabin Air Assembly) dehumidifier. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Oleg Kotov serviced the long-term BIO-5 Rasteniya-1 ("Plants-1") micro-G growth payload in the Lada-10/MIS (Module for the Investigation of Substrates)

greenhouse, collecting measurement reading for downlink, and filling the KDV water tank from the spare KOV-EDV container.

Oleg also retrieved and stowed the two FMKs (Formaldehyde Monitoring Kits) deployed by Clay on 7/9 in the Lab (below CEVIS cycle) and SM (most forward handrail).

At ~9:00am EDT, the crew participated in PAO TV/Educational Event at NASA-JSC/Houston by and for Texas Aerospace Scholars, Clear Lake high school students, interns, co-ops, and STS-118/Endeavour crewmembers Scott Kelly, Barbara Morgan, and Canadian Dave Williams. Questions were uplinked beforehand. [*“Clay: What experiences have helped you cope with the demands and the limitations of space?”; “Oleg: Is it difficult to adjust to living and working in microgravity?”; “Fyodor: How has being a crewmember on a long-duration flight and the long-term stays at the ISS affected your family?”*]

Yurchikhin performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables. Fyodor also checked on the ongoing processing (“regeneration”) of US-collected condensate water (KAV) in the Russian water processing system (SRV-K2M).

Kotov did the IMS (Inventory Management System) updating today, editing its standard “delta file” for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Anderson conducted the periodic status checkup & filter inspection of the running CSI (CGBA Science Insert)-4/5 payload of seed germination modules and nematode worms housed in the CGBA (Commercial Generic Bioprocessing Apparatus) incubator. [*The incubator is controlled from the ground with automatic video downlinked to Earth. Students in the U.S. and Malaysia are participating in educational activities in their classrooms while monitoring the growth in orbit.*]

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Oleg will copy the crew’s exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*Russian Software Transition Update:* RS SM 7.05 software upgrade is continuing. On 7/9, the two KTSP1 & KTSP2 Central Post Computers were loaded with 7.05 file structures (images), but the loading ran into trouble with KTSP1. Troubleshooting was conducted yesterday (7/10), along with successful 7.05 software uploading to KTSP2. Further KTSP1 troubleshooting was being considered for today, with consultation of the German software provider. On 7/16, the two GNC (Guidance, Navigation & Control) computers TVM (Terminal) & TsVM (Central) will be restarted on all six lanes (with jumpers) with context data, followed by testing of all six processor channels on 7/17. On 7/18, SM 7.05 will be uploaded to TVM & TsVM, to be checked for functionality in the planned Progress 25P firing test on 7/20. The main ISS reboost is then scheduled for 7/23, shortly after EVA-9.

Still on the Russian “time permitting” task list for Kotov and Yurchikhin remains equipment auditing/inventorying in the RS.

Today’s CEO (Crew Earth Observation) photo targets were **Tunis, Tunisia** (*the Tunisian capital city is also a port situated on a large bay in the northeastern part of the country. On this early afternoon, fair weather pass, as ISS approached the coast from the NW, the crew was to look just right of track, trying to map the urban margins in detail*), **Coast Mountains** (*these ranges of western British Columbia are a northern extension of the Cascade Ranges in the US. However the higher latitude and plentiful snowfall here support a number of small ice fields and numerous valley glaciers, many of which are now in rapid retreat. In this fair weather, mid-morning pass, the crew was to try for near-nadir views of the larger ice fields and glaciers that they could map in detail*), and **Utah Fires** (**DYNAMIC EVENT:** *The Milford Flat fire in southwestern Utah is the largest in state history and is still not under control. Started by lightning late last week, the fire aided by 50mph winds and years of drought has burned over 300,000 acres. ISS had an early afternoon pass with partly cloudy conditions expected. As it crossed Great Salt Lake, the crew was to begin looking for the smoke plumes well right of track, trying for high obliques and pans of the fire area and the extent of the plumes*).

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<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:18am EDT [= epoch]*):

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Apogee height – 339.3 km

Perigee height -- 327.8 km

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Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0008636  
Solar Beta Angle -- -18.4 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in the last 48 hours -- 88 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49460

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/11/07 -- U.S. OGS (Oxygen Generation System) activation  
07/15/07 -- FGB Solar Array Efficiency Test  
07/20/07 -- Thruster/reboost test of functionality of new Russian software (vers. 7.05)  
07/23/07 -- US EVA-9 (~11:00am EDT, est.)  
07/23/07 -- ISS reboost with Progress 25P  
08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry  
08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)  
08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- SSRMS setup for viewing PMA-3 relocation  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks [*under review*]  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch [*to be reviewed*]  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking

??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/10/07  
**Date:** Tuesday, July 10, 2007 2:27:23 PM  
**Attachments:**

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**ISS On-Orbit Status 07/10/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-2 Anderson supported his current (first) seven-day SLEEP experiment by accessing the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

CDR Yurchikhin and FE-2 Anderson, with TsUP/Moscow, used several RGS (Russian Groundsite) comm passes for testing the new photo/TV setup of the RS (Russian Segment) video downlink in PAL mode through US comm assets. Afterwards, Anderson disassembled the Ku-band drag-through hookup from the FGB and turned off the enabling SSC (Station Support Computer) A31p laptop in the FGB. *[Testing included both the Russian primary and backup Klest KL-154 TV cameras, with special test patterns through the new BFI data generation unit (Channel A) which replaced the previous rendezvous parameter output control unit (BUVK-Ts). The setup, along with the SM 7.05 software upgrade, uses the new LCD/liquid-crystal display monitor (IT-ZhK) installed by Misha Tyurin earlier this year instead of the old CRT (Cathode Ray Tube) Simvol-Ts unit, to enable signal transmission in the European PAL television system of the ATV (Automated Transfer Vehicle), Soyuz and Progress dockings to both the crew and the ground via Ku-band. PAL (Phase Alternating Line) is the TV color encoding system used in Europe (except France), as opposed to the USA's NTSC or Russia's (and France's) SECAM. ]*

Preparatory to a planned recharge of the Russian SKV1 air conditioner's coolant

loop with Khladon-218 (Freon-218) coolant, Fyodor used the medical mass measuring device, prepared yesterday, to determine the “weight” (mass) of three Khladon containers from FGB stowage. The spring-operated “scales” (IM) were then restowed. *[Expected loading per bottle: ~300 g,]*

Continuing the transition of the Russian computer system to the new vers. 7.05 software, the CDR installed 7.05 from DVD on Laptop 2 by HDD (Hard Disk Drive) “cloning”, for subsequent installation on the two Central Post Computers (KTsP1 & KTsP2). The uploading was supported by ground specialist tagup.

FE-2 Anderson had another 45 min reserved for gathering trash & discarded equipment and stowing it in the Progress M-59/24P cargo ship-turned-trash can for disposal, based on uplinked lists of identified Russian & US equipment. Transfers are being logged in the IMS (Inventory Management System). *[24P, currently docked at the DC1, will be jettisoned in three weeks (8/1).]*

After temporarily clearing stowage from the ZSR (Zero-G Stowage Rack) in the Node endcone to enable rack rotation, Anderson connected the SPS (Secondary Power System) via power cable (P271-to-J271) behind the ZSR to provide electricity to two Russian SNT voltage & current stabilizer units (transformers),- SNT-23 & SNT-24. Afterwards, the rack and its stowage were restored to initial configuration.

The crew performed the mandatory 90-min OBT (onboard training) emergency egress drill for the case of rapid cabin depressurization, with Russian and US specialists standing by at both control centers for crew questions or comments. During the drill, the crewmembers proceeded through a prescribed series of timed station checkpoints, determining and verifying valve settings, instruments measurements, hatch configurations, etc. A 20-min joint drill debrief via S-band to the ground concluded the exercise, led by TsUP/Moscow. *[Background: Purpose of the drill is to practice (a) crew response procedures in the event of ISS depress, (b) communication and coordination between crew and the ground in such an emergency, and (c) communication and coordination among crew members themselves. In the RS, the crew translated along the emergency egress path to the FGB nadir port (where Soyuz TMA-10 is currently docked), stepped through the process of preparing Progress 24P at the DC1 for undocking, etc. Soyuz and ISS communications were restored to nominal stage ops after the exercise.]*

Anderson serviced the ALTEA (Anomalous Long Term Effects on Astronauts) hardware, recovering the experiment’s DAU (Data Acquisition Unit) with the usual ALTEA CPU (Central Processing Unit) lockup procedure and readying the video equipment.

Clay also worked on the EXPRESS Rack 4 laptop (EL4), removing its suspect battery and reinstalling its CD-ROM. *[To allow rebooting the laptop for restarting ALTEA DOS (dosimetry) data collection. Later, the plan is to upgrade the laptop plus software to an A31p load, so that the ground can command the periodic laptop reboots in the future.]*

FE-1 Kotov completed the daily status check of the newly installed BIO-5 Rasteniya-2 ("Plants-2") experiment, taking initial substrate data. *[Rasteniya researches growth and development of plants under spaceflight conditions in the Lada-10 greenhouse. The regular BIO-5 maintenance involves monitoring of seedling growth, humidity measurements, moistening of the substrate if necessary, topping off the water tank as required, and photo/video recording.]*

Clay completed his first run with the MedOps WinSCAT (Spaceflight Cognitive Assessment Tool) experiment by logging in on the MEC (Medical Equipment Computer) and performing the psychological evaluation exercise on the laptop-based WinSCAT experiment. *[WinSCAT is a time-constrained questionnaire test of cognitive abilities, routinely performed by astronauts aboard the ISS every 30 days before or after the PHS (periodic health status) test or on special CDR's, crewmembers or flight surgeons request.]*

For the periodic analysis of the cabin atmosphere on the ground, the FE-2 collected air samples with the GSC (Grab Sample Container) at the center of the SM and Lab.

To help the ground in investigating an interference between a screen installed on an SM panel (#322) with the opening of another panel (#425), Oleg took photography of the configuration for downlink via OCA and tagged up with ground specialists.

Yurchikhin performed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the Service Module (SM), including ASU toilet facilities systems/replaceables.

Clay did the IMS (Inventory Management System) updating today, editing the its standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later tonight, Anderson copies the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the

workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Still remaining on the Russian “time permitting” task list for Kotov and Yurchikhin is equipment auditing/inventorying in the RS.

*Saturday Science Update:* Two optional activities for the voluntary “Saturday Science” program on 7/14 &15 were suggested to Clay for his choice. His selection is required by tonight. *[The three choices are (1) a new run of CFE VG1 (Capillary Flow Experiment – Vane Gap 1), (2) a session with SWAB (Surface, Water & Air Biocharacterization), using advanced molecular techniques for a comprehensive characterization of microorganisms and allergens in spacecraft, which allows an assessment of the risk of microbes to the crew and spacecraft.]*

Early this morning, MCC-Houston conducted another BCC (Backup Control Center) dry run in test mode, with no involvement of the ISS crew or vehicle. The seven-hour exercise started at 1:00am EDT. *[Purpose of this periodic exercise is to demonstrate BCC functionality under Russian assets while providing proficiency training for Moscow-HSG (Houston Support Group) personnel at the HSR (Houston Support Room) and TsUP-Moscow specialists.]*

Today’s CEO (Crew Earth Observation) photo targets were **Lahore, Pakistan** (*this teeming city of over 8 million people is located in the northeastern edge of the Indus River Valley near the border with India. ISS approach was from the NW. As the crew passed the Hindu Kush and began crossing the SW-ward flowing streams of the Indus River Valley, they were to look just left of track for Lahore and attempt a long-lens mapping of details of the urban margins. The pass was expected to be in fair weather with early afternoon sun and some smog likely*), **Yellowstone National Park, Wyoming** (*this famous national park is centered in the NW corner of Wyoming and includes a large lake with that name. CEO is monitoring changes in land use and appearance due to both human activities and fires. On this fine midday pass, the crew was to look just right of track and try for a detailed mapping of the edges of Lake Yellowstone and if possible the area north of it*), and **Florida Coastal Everglades** (*the Florida Everglades is a vast wetlands area occupying much of the State of Florida south of Lake Okeechobee. This ISS pass was in early afternoon and only a few scattered clouds were expected for this near-nadir pass over the SW coast. Mapping in detail the coast from just south of Charlotte Harbor in the north to Cape Sable in the south*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:38am EDT [= epoch]*):

Mean altitude -- 333.6 km

Apogee height -- 339.4 km

Perigee height -- 327.8 km

Period -- 91.20 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008629

Solar Beta Angle -- -21.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in the last 48 hours -- 88 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49445

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/11/07 -- U.S. OGS (Oxygen Generation System) activation

07/15/07 -- Solar Array Efficiency Test

07/20/07 -- Thruster/reboost test of functionality of new Russian software (vers. 7.05)

07/23/07 -- US EVA-9 (~11:00am EDT, est.)

07/23/07 -- ISS reboost with Progress 25P

08/01/07 -- Progress M-59/24P undocking (DC1 nadir) & reentry

08/02/07 -- Progress M-61/26P launch

08/05/07 -- Progress M-61/26P docking (DC1 nadir)

08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/09/07 -- STS-118/Endeavour/13A.1 docking (DO 1 + 20 min)

08/19/07 -- STS-118/Endeavour/13A.1 undocking (DO 1 + 20 min)

08/21/07 -- STS-118/Endeavour/13A.1 landing

08/??/07 -- SSRMS setup for viewing PMA-3 relocation

08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]

09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1) & reentry

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)

10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing

10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks [*under review*]

10/20/07 -- (NET) STS-120/Discovery/10A docking

10/22/07 -- (NET) Node 2 relocation

10/29/07 -- (NET) STS-120/Discovery/10A undocking

11/06/07 -- US EVA-10

11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/09/07  
**Date:** Monday, July 09, 2007 1:00:11 PM  
**Attachments:**

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### **ISS On-Orbit Status 07/09/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 12 of Increment 15*

FE-2 Anderson started his first seven-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) assessment by filling in the sleep log and questionnaire entries in the experiment's laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor Clay's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as his patterns of sleep and activity throughout the Expedition.]*

CDR Yurchikhin worked on the Simvol-Ts color television setup, used normally for the TORU manual teleoperator system, connecting cables of the Russian TVS/Klest television system to its new LCD/liquid-crystal display monitor (IT-ZhK), installed by Tyurin earlier this year, to enable signal transmission in the European PAL TV system. *[The new setup is part of the ATV (Automated Transfer Vehicle) prox ops equipment (PCE), to be used for monitoring ATV arrival and docking.]*

Anderson set up an SSC (Station Support Computer) A31p laptop in the FGB for handling the video transmission of TV signals from the Russian segment (RS) via single cable to Ku-band assets equipment in the US segment (USOS), to support a ground-controlled test of the Russian PAL downlink. Clay deactivated the A31p after the test.

As the first step in transitioning the RS computer system to the new vers. 7.05 software, Yurchikhin today worked on deploying the 7.05 "images" (file structures) from DVD to Laptop 2 and then to the two Central Post Computers (KTsP1 & KTsP2), with ~1.5 h reserved for each computer. The uploading was supported by ground specialist tagup.

After configuring the new Bubble dosimeters on 7/3 for recording radiation traces as a component of the RS radiation payload suite "Matryoshka-R", FE-1 Kotov today repositioned dosimeters, took collected data in the MOSFET (metal oxide semiconductor field-effect transistor) dosimeter reader/display and logged measurements, with tagup support from the ground. *[The complex Matryoshka payload suite is designed for sophisticated radiation studies. Besides the Phantom Sphere in the DC1, which is equipped with individual horizontal slice-like layers of thermoluminescent detectors (TLDs) and nuclear radiation tracking detectors (NTDPs), dosimeters are also deployed at other locations (such as the starboard crew cabin). The payload collects radiation measurements every 15 minutes of each hour around the clock. Note: Matryoshka is the name for the traditional Russian set of nested dolls.]*

As required for some of today's work, the CDR early this morning switched the Vozdukh CO<sub>2</sub> (Carbon Dioxide) removal system to autonomous mode (automatic cycle control between absorbent beds) and later in the morning returned it to manual mode 5.

Yurchikhin also performed the periodic (monthly) functional closure test of spare emergency vacuum valves (AVK) for the Vozdukh, in the spare parts kit. *[The AVKs are critical because they close the Vozdukh's vacuum access lines in the event of a malfunction in the regular vacuum valves (BVK) or a depressurization in the Vozdukh valve panel (BOA). Access to vacuum is required to vent CO<sub>2</sub> during the regeneration of the absorbent cartridges (PP). During nominal operation, the AVK valves remain open.]*

Preparatory to a planned recharge of the Russian SKV1 air conditioner with Khladon-218 (Freon-218) coolant, Fyodor configured the necessary equipment for "weighing" (determining small-scale mass) of three Khladon containers from FGB stowage. *[The actual mass measurements (expected: ~300 g) are scheduled tomorrow.]*

Oleg Kotov meanwhile had 2 hrs reserved to perform regular transfer of liquid waste from three filled EDV-U urine containers to the BV1 tank of the Progress M-60/25P cargo ship, then flushing the BV1 with disinfectant solution from another EDV. *[Each of the Progress' two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before receiving the liquid waste.]*

Anderson offloaded the Lab CCAA (Common Cabin Air Assembly) condensate collection tank, filling a CWC (Contingency Water Container, #1054) with the collected water slated for processing. *[Estimated offload time before termination (leaving ~5.25 kg in the tank): ~60 min.]*

The FE-2 also switched cooling on the starboard & portside CCAs in the Lab, closing the ITCS LTL (Internal Thermal Control System/Low Temperature Loop) flow to the first and initiating it on the second.

Oleg and Clay each completed the mandatory 30-min. CBT (computer-based training with video and audio) to refresh their CMO (Crew Medical Officer) proficiency/rating. *[To maintain proficiency in using HMS (health maintenance systems) hardware including ACLS (advanced cardiac life support) in contingency situations where crew life is at risk, these training sessions are performed once a month to review equipment and procedures via CBT. Besides ACLS, procedures include airway obstruction management, i.e., review of suction device, nasal airway, intubating laryngeal mask airway (ILMA) with endotracheal tube, and cricothyrotomy (incision to re-enable breathing air inflow).]*

As a regular periodic task, the FE-2 deployed two passive FMK (Formaldehyde Monitoring Kit) sampling assemblies in the Lab (below CEVIS) and Service Module (SM, most forward handrail), to catch any atmospheric formaldehyde on a collector substrate for subsequent analysis on the ground.

Clay also assembled, configured and activated the U.S. EarthKAM (EK) hardware for a new session (the 27<sup>th</sup> time aboard the ISS and the 2<sup>nd</sup> time on Increment 15). *[EK is using a DCS 760 electronic still camera with 50mm (f/1.4) lens at the Lab science window, powered by 16Vdc from a 28 Vdc adapter, taking pictures by remote operation from the ground, without crew interaction. Numerous schools are participating in this EarthKAM session. EarthKAM is an education program that enables thousands of students to photograph and examine Earth from the unique perspective of space, integrating the excitement of ISS with middle-school education. The student requests are uplinked in a camera control file to an A31p SSC (Station Support Computer) laptop which then activates the camera at specified times and receives the digital images from the camera's storage card on its hard drive, for subsequent downlink via OPS LAN.]*

Kotov performed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including ASU toilet facilities systems/replaceables.

Afterwards, Oleg worked on the IMS (Inventory Management System) standard "delta file", updating/editing it for the regular weekly automated export/import to its

three databases on the ground (Houston, Moscow, Baikonur).

Anderson had three hours set aside for gathering trash & discarded equipment and stowing it in the Progress M-59/24P cargo ship-turned-trash can for disposal, based on uplinked lists of identified Russian & US equipment. Transfers are being logged in the IMS (Inventory Management System). *[24P, currently docked at the DC1, will be jettisoned in three weeks (8/1).]*

At ~2:20pm EDT, Clay will tag up with the ground for an on-orbit debrief on handover activities and the Handover Book used during the 13A docked period.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later, Clay will copy the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Still remaining on the Russian "time permitting" task list for Kotov and Yurchikhin is equipment auditing/inventorying in the RS.

*KURS Update:* After last week's (7/5) problem encountered with the 2<sup>nd</sup> string of the KURS automated rendezvous & approach radio system during a test, RSC-Energia will conduct more testing early tomorrow morning, starting at 1:30am EDT and lasting for two orbits. A thruster test is still being planned on 7/21 as a functionality check of the new Russian software vers. 7.05.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 7:11am EDT [= epoch]):*

Mean altitude -- 333.7 km

Apogee height – 339.5 km

Perigee height -- 328.0 km

Period -- 91.21 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0008563  
Solar Beta Angle -- -23.6 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in the last 48 hours -- 88 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49429

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/11/07 -- U.S. OGS (Oxygen Generation System) activation  
07/21/07 -- Thruster/reboost test of functionality of new Russian software (vers. 7.05)  
07/23/07 -- US EVA-9 (~11:00am EDT, est.)  
07/24/07 -- ISS reboost  
08/01/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking  
08/19/07 -- STS-118/Endeavour/13A.1 undocking  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)

02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/08/07  
**Date:** Sunday, July 08, 2007 10:58:36 AM  
**Attachments:**

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**ISS On-Orbit Status 07/08/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Clay Anderson). Ahead: Week 12 of Increment 15*

The CDR performed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM) and the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Yurchikhin also gathered data on total operating time & On durations of the Russian POTOК-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

After a software anomaly with the MCA (Major Constituents Analyzer) last night, NASA Flight Controllers had FE-2 Anderson use the CDMK (CO<sub>2</sub> Monitor Kit, #1007) to do a quick double-check on ppCO<sub>2</sub> (Carbon Dioxide Partial Pressure). Also, for a planned activation of the CDRA (CO<sub>2</sub> Removal Assembly) Clay was to connect the LTL coolant supply line to the Lab D6 rack.

Anderson printed out new uplinked procedures pages, which he then inserted in the SODF (Station Operations Data File) Warning Book to bring it up to date, along with P&I (pen & ink) changes. *[This task was rescheduled from yesterday.]*

Clay terminated the recharge on the second set of EMU (Extravehicular Mobility Unit) batteries in the US Airlock BSA (Battery Stowage Assembly) as last step in preparing the spacewalk equipment for EVA-9 on 7/23.

Working off the Russian voluntary task list, Yurchikhin conducted another session

with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature.

*[Today's Uragan photo targets were Kalmykia, views of the arid-season steppe south of nadir, the Volga River arms to the south of Astrakhan, oil spills in the Caspian Sea, and lakes at the northern Danube arm around Izmail.]*

A discretionary task list item for Oleg Kotov was another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Japanese HDV video camera to obtain imagery of the bio-luminescent glow of high production zones from SM window #7. *[Photo targets were the offshore area of Tasmania, the Tasmanian Sea, the sub-Antarctic frontal area of the Pacific Ocean to the SW of Easter Island, and the Equator area.]*

At ~3:45am EDT, Yurchikhin and Kotov downlinked two PAO/TV messages of greetings and congratulation, (a) to the staff of the VSK-Tour Company on its professional holiday, the International Day of Tourism, and (b) to the 16<sup>th</sup> International Slavic Bazaar Arts Festival in Vitebsk on July 12. *["...Cosmonauts go to work in space for many months, and their loved ones stay on the ground. Their long separation is eased by visiting different places on our beautiful "blue planet" Earth. And here's where our long-standing and reliable partner, VSK-Tour Company, has been very helpful. We express our sincere gratitude for the continuous service that you provide in organizing leisure activities for families of astronauts and MCC specialists in the Mediterranean..."; "...Today {7/12} we are celebrating Day of Russia at the Slavic Bazaar in Vitebsk, and on the stage of the Amphitheater you will see your well-known and favorite Russian performers... We would like to greet the audience of today's concert, numerous TV viewers, all the participants of Day of Russia and of Slavic Bazaar..."]*

The crew was thanked for yesterday's "Saturday Science" program which featured an EPO (Education Payload Operations) demo of On-Orbit Hobbies. *[“That was a great EPO performance yesterday! We'd like to see you take your next shot from behind the 3-point line, which unfortunately, by our calculations, should be from inside PMA2. We also think you got fouled in your shot attempt by the Bogen Arm.”]*

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:06am EDT [= epoch]*):

Mean altitude -- 333.8 km  
Apogee height -- 339.5 km  
Perigee height -- 328.1 km  
Period -- 91.21 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0008447  
Solar Beta Angle -- -25.6 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in the last 48 hours -- 98 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49413

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/11/07 -- U.S. OGS (Oxygen Generation System) activation  
07/21/07 -- Thruster/reboost test of functionality of new Russian software (vers. 7.05)  
07/23/07 -- US EVA-9 (~11:00am EDT, est.)  
07/24/07 -- ISS reboost  
08/01/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking  
08/19/07 -- STS-118/Endeavour/13A.1 undocking  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks [*under review*]  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking

11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/07/07  
**Date:** Saturday, July 07, 2007 1:53:17 PM  
**Attachments:**

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## ISS On-Orbit Status **07/07/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 15 crew CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Clay Anderson, except for regular maintenance & voluntary work.*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, Fyodor and Oleg also performed preventive maintenance cleaning on SM fans & grilles VPKhO, VDPrK, VPrK, and on the V3 ventilator grill in the DC1 (Docking Compartment).

Before breakfast, FE-2 Anderson completed the last day of his second session with the NASA/JSC experiment NUTRITION. During today's part, he collected another urine sample for storage in the MELFI (Minus-Eighty Laboratory Freezer for ISS). The sampling kit was then stowed away. Clay's next session will be in about a month, on his FD60 (Flight Day 60). *[The current NUTRITION project expands the previous Clinical Nutritional Assessment profile (MR016L) testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

FE-1 Kotov terminated the hardware test run started yesterday on the new equipment for the BIO-5 RASTENIYA-1 ("Plants-1") micro-G growth payload, delivered on Progress 25P. A tagup with ground specialists followed. *[The hardware includes a module (MIS/Module for the Investigation of Substrates), a MIS control unit (BU), a nitrogen purge unit (BPA) and other accessories. Rasteniya researches growth and development of plants under spaceflight conditions in the LADA-10 greenhouse.]*

For today's "Saturday Science" program, Clay Anderson had selected the EPO (Education Payload Operations) demo of On-Orbit Hobbies. After setting up the video equipment for the planned DVD, the crew demonstrated some of their favorite activities while on the ISS. *[For Clay, of particular interest are the EPO plant growth chambers which he will be working with after STS-118: "Hello, I am Clay Anderson, Expedition 15 Flight Engineer, and I am living and working aboard the International Space Station. During my expedition I will be growing lettuce and basil in specially designed and engineered growth chambers. You can also participate by joining the STS-118 Engineering Design Challenge to design, analyze, build, and assess your very own plant growth chamber. So start designing and maybe someday your growth chambers could be used on the moon or even Mars. Check it out at [www.nasa.gov](http://www.nasa.gov)!"]*

At ~8:55am EDT, the crew conducted their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Yurchikhin performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables. Fyodor also checked on the ongoing processing ("regenerating") of US-collected condensate water (KAV) in the Russian water processing system (SRV-K2M).

Working off the Russian voluntary task list, the CDR conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature.

*[Today's Uragan photo targets were the steppe to the south of Kursk and Voronezh, followed by strip photography with overlapping frames, the left bank of the Volga river near Saratov, Y.A. Gagarin's landing place, Ugra National Park, the Aral Sea coast, glaciers located to the west of Fedchenko Glacier, the RGO and Medvezhy Glaciers, Aleksandrovka, glaciers on the North slope of the main Caucasus Range to the Elbrus, Tuapse, checking on media reports an oil spill*

*several kilometers in the Caspian Sea, glaciers from Elbrus to Kazbek, and Kolka Glacier in nadir).*

Also off the task list, Oleg Kotov used the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON) to support ecological studies. *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

At ~3:40pm, the FE-2 will set up the SM's Kenwood amateur radio equipment for a ham session at 3:45pm with students gathered at the Challenger Learning Center of Alaska in Kenai, Alaska. *[The Challenger Learning Center of Alaska is a vital and valuable educational resource for the state and is recognized as a strong component of the state's educational system. Questions to Clay were uplinked beforehand. "Do you belief in life on other planets?"; "Does living in space affect your hair or fingernail growth?"; "How is the digestive process affected by the lack of gravity?"...]*

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later today, Clay will transfer the crew's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*SSC File Server Restoration:* Flight Controllers and Clay Anderson worked hard for several hours last night on recovering the onboard SSC (Station Support Computer) File Server to its Expedition 15 condition, after a temporary interruption, which affected onboard LAN (Local Area Network) functions like the all-important ingenious OSTPV (Onboard Short Term Plan Viewer), IPV (International Procedure Viewer), Crew Email, Daily Mail, IMS (Inventory Management System), and World Map. The FS was freshly reloaded with Expedition 15 software and all SSC Clients were reregistered. Kudos went up to Clay, and his scheduled task of updating the Warning Book was shifted to tomorrow.

### **Weekly Science Update** (*Expedition Fifteen -- 11<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* ALTEINO is performing nominally according to the latest information.

*ANITA*: Planned.

*BCAT (Binary Colloidal Alloy Test)*: Reserve.

*CARDIOCOG-2*: Session performed nominally on 7/2. Data will be assessed by science team upon receipt.

*CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS)*: “Clay, we really appreciate your efforts to complete the first CCISS session during your weekend and are grateful for the video. The final on-orbit CCISS activity will be to repeat the same procedure within 14 days before you leave.”

*CFE (Capillary Flow Experiment)*: Reserve.

*CHROMOSOME-2 (E14 SFP)*: Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus)*: In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2)*: In support for BCAT-3 only.

*EarthKAM (Earth Knowledge Acquired by Middle School Students)*: Complete.

*EMCH (Elastic Memory Composite Hinge)*: Complete.

*EPO (Educational Payload Operation) Kit C*: Planned.

*IMMUNO (Saliva Sampling)*: Planned.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*: Complete.

*MISSE (Materials ISS Experiment)*: Ongoing.

*MTR-2 (Russian radiation measurements)*: Passive dosimeters measurements in DC1 “Pirs”.

*MULTIGEN-1*: Planned

*MUSCLE (E14 SFP)*: Completed.

*MSG-SAME (Microgravity Science Glovebox)*: Planned.

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION:* "Clay, we were very impressed with the blood draw, and it was great to see it on live video. The video is going to be an invaluable training tool for us in the future. We'll see you in about 30 days."

*SAMPLE:* Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Next week Anderson completes his first week of sleep logging. "These are the same questions you answered during your Baseline Data Collection (BDC) only they will be in electronic format on the SSCs. The requirement for the experiment is three weeks of sleep logging during various sleep shifting. The sessions will be timelined."

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 6/27 the ground has received a total of 5,581 CEO images for review and cataloging for Increment 15. "You have acquired useful imagery for portions of two of our targets so far: The Karakoram and Lake Nasser, Toshka Lakes, Egypt. The overall quality and composition of your photography is good. Please continue to practice when you can with the 400 and 800mm lens settings to improve on focus. We appreciate any and all feedback you can provide us on the imagery you are acquiring and on the helpfulness of our target list product."

Today's CEO (Crew Earth Observation) photo targets were **Japan Islands** (*the ISS pass for this target was in mid-afternoon in good light. However a frontal zone with dense cloud bands was expected to cover the entire southern half of country with clouds also covering most of the island of Hokkaido to the north. Only a few breaks may have occurred in the northern part of the main island of Honshu. Acquiring imagery where possible*), **Kellogg Biological Station, Michigan** (*this Long Term Ecological Research [LTER] site is located in SW Michigan in the eastern portion of the U.S. Corn Belt, 50 km east of Lake Michigan. CEO is seeking good context views of this site and its surrounding*

area for use in directing more detailed long lens views. This pass was in early morning light, clear skies were expected. Trying for a mapping pass of the area E of Lake Michigan and SW of Lansing), **Arkenu 1** and **Arkenu 2 Impact Craters** (this 140 million year old, double impact site is located in the remote desert area of southeastern corner of Libya. ISS approached in the mid-afternoon sun and in clear weather. There numerous circular rock outcrops and features in this area), and **West Hawk Impact Crater** (this 351 million year old impact site is about 2.5km in diameter and is marked by a small lake about 100km E of Winnipeg and 60km N of Lake of the Woods. This pass was near midday and the approach from the W. After crossing the city of Winnipeg the crew was to begin looking for this feature just right of track).

NOTE: Japan has been added as a CEO site, with the objective to image as much of Japan as possible, using the Russian Sony Z1 camcorder (usable only in the Russian segment). The HD (High Definition) camcorder imagery will be used for science, education and public relations activities. If conditions are too cloudy or hazy for the current daylight overpasses, the target zones will be rescheduled for the next set of daylight overpasses. Instructions are to “minimize zooms and pans, and let the resolution of the camcorder do the work. If you can get a medium tight shot of Mt. Fuji that would be a bonus.”

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 6:50am EDT [= epoch]):

Mean altitude -- 333.9 km

Apogee height -- 339.5 km

Perigee height -- 328.3 km

Period -- 91.21 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.000832

Solar Beta Angle -- -27.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in the last 48 hours -- 110 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49397

**Significant Events Ahead** (all dates Eastern and subject to change):

07/11/07 -- U.S. OGS (Oxygen Generation System) activation

07/21/07 -- Thruster/reboost test of functionality of new Russian software (vers.

7.05)

07/23/07 -- US EVA-9 (~11:00am EDT, est.)  
07/24/07 -- ISS reboost  
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08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking  
08/19/07 -- STS-118/Endeavour/13A.1 undocking  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)

04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/06/07  
**Date:** Friday, July 06, 2007 12:51:47 PM  
**Attachments:**

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**ISS On-Orbit Status 07/06/07**

All ISS systems continue to function nominally, except those noted previously or below. *The day before 07/07/07!*

Before breakfast, FE-2 Anderson began his second session with the NASA/JSC experiment NUTRITION, for which he had to forego exercising and food intake for eight hours. *[After collecting an initial urine sample, Clay followed it with phlebotomy, i.e., drawing blood samples (from an arm vein) which he first allowed to coagulate, then spun in the HRF RC (Human Research Facility/Refrigerated Centrifuge) and finally placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. Anderson also started the required 24-hour data urine collection by securing samples during the day, all stored immediately in MELFI. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

After consulting with ground specialists via tagup, FE-1 Kotov unloaded new

equipment for the BIO-5 RASTENIYA-1 (“Plants-1”) micro-G growth payload from Progress 25P. After removing and stowing old Plants-2 hardware, Oleg installed the new payload in the Service Module (SM) near the LADA greenhouse, then checked it out. *[The payload hardware includes a module (MIS/Module for the Investigation of Substrates), a MIS control unit (BU), a nitrogen purge unit (BPA) and other accessories. Rasteniya researches growth and development of plants under spaceflight conditions in the LADA-10 greenhouse.]*

CDR Yurchikhin performed IFM (In-flight Maintenance) on the SBI (Onboard Data Measuring & Storage System) in the SM, installing shielding for two temperature sensors (TM168-4), after having replaced one of them with a new spare.

Using the auditory test equipment, Oleg Kotov and Fyodor Yurchikhin took the periodic O-OHA (on-orbit hearing assessment) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC (Medical Equipment Computer) laptop application. Clay Anderson underwent his first hearing test several days ago (6/22). *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month. Note: There have been temporary hearing deficits documented on some U.S. and Russian crewmembers, all of which recovered to pre-mission levels.]*

With the latest run of the Russian/German TEKh-20 Plazmennyyi-Kristall/PK-3+ (Plasma Crystal-3+) experiment ended on 7/3, the CDR removed the payload hardware and prepared it in a kit for return to the ground. *[Main objective of PK-3 in zero-G is to study dust plasma wave propagation and dispersion ratio at a specified power of an alternating electric field, pressure, and a varied number of particles, controlled by the experimenter.]*

Time again for recharging the new Motorola-9505 Iridium satellite phone brought up on Soyuz 14S, a monthly routine job. Yurchikhin took care of the recharge, completing the process and cleaning up at about 6:25am EDT. *[After retrieving it from its location in the Soyuz TMA-10/14S descent module (BO), Fyodor initiated the recharging of its lithium-ion battery, monitoring the process every 10-15 minutes as it took place. Upon completion, the phone was returned inside its SSSP Iridium*

*kit and stowed it back in the BO's operational data files (ODF) container. The satphone accompanies returning ISS crews on Soyuz reentry & landing for contingency communications with SAR (Search-and-Rescue) personnel after touchdown. The Russian-developed procedure for the monthly recharging has been approved jointly by safety officials. During the procedure, the phone is left in its fire-protective fluoroplastic bag with open flap.]*

FE-2 Anderson conducted "Week 11" sampling of potable water for chemical analysis from the SVO-ZV tap and the SRV-K hot tap, the latter after preliminary heating of the water (two heating cycles) and flushing. *[Clay collected a two 750 mL samples for return on 13A.1 and chemical post-flight analysis.]*

The FE-2 performed the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[Purpose of the 10-min. activity is to correlate the hand-held readings with MCA (Major Constituents Analyzer) measurements. Two CSA-CP (CSA-Combustion Products) instruments recorded O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post (#1057, prime) and in the Node (#1060, backup), while the CSA-O<sub>2</sub> units (#1056, #1059) looked for O<sub>2</sub> in the Lab and the CDMK (#1007) for CO<sub>2</sub> in SM and Lab. Also recorded were battery ticks. The instruments were turned off afterwards, except for the prime CSA-CP #1057 unit, and returned to their regular locations.]*

The CDR had another 45 min reserved for additional troubleshooting of the TVM (Terminal) and TsVM (Central) computers in the Russian Segment (RS), using the "Elektronika MMTs-01" MultiMeter to repeat resistance measurements on two specific contacts of a suspect connector to the BOK-3 Command Processing Unit. *[As a result of the testing performed to date, Russian specialists have determined that the computers are fully functional. Work is now underway to manifest a new BOK-3 and associated cabling on Progress 26P to replace the current onboard units.]*

The crewmembers joined up in a half-hour Transition OBT (On-Board Training) session for the new CCS X2R6 software, to get acquainted with the changes and new interfaces after the successful USOS computer transition of the last four days. *[Among else, the biggest change for the crew relates to the R10 software load of the PCS (Portable Computer system) laptops, with changes in their startup, reconnect and reboot procedures. There are also some improvements in the MCS C&W (Motion Control System Caution & Warning), plus the addition of an FDIR (Failure Detection, Isolation & Recovery) system for the S-band, for automatic*

*switching of strings or to LDR (Low Data Rate) if necessary, after a given time interval.]*

Anderson filled out the regular FFQ (Food Frequency Questionnaire), his second, on the MEC. *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Clay also did the regular bi-weekly maintenance reboots of the SSC (Station Support Computer) File Server and OCA Comm Router laptops as well as the weekly reboots of the PCS A31p laptops.

The FE-2 had another hour reserved for initial hardware gathering and prepacking for return on 13A.1/Endeavour next month.

Oleg Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The FE-1 also updated/edited the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-1, FE-2), TVIS (CDR), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later today, Kotov will transfer the crew's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~3:55am EDT, Fyodor and Oleg linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Discussions today concerned bags with video cassettes found by the crew in the SM and FGB, along with other cassettes, and their proper identification and inclusion in the IMS database.]*

At ~4:25am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-

band/audio, phone-patched from Houston and Moscow.

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio is timelined later at ~3:45pm.

At ~4:40am, CDR Yurchikhin supported the SPP (Automated Onboard Sequencer)-controlled downlink of a video tape showing the Progress M-60/25P docking on 5/15, from the LIV camcorder to TsUP/Moscow during an RGS (Russian Groundsites) comm window for PAO purposes.

Still on the Russian "time permitting" task list for Kotov and Yurchikhin is equipment auditing/inventorying in the RS.

Today's CEO (Crew Earth Observation) photo targets were **Kabul, Afghanistan** (*the Afghan capital is located in the valley of the Kabul River in the rugged highlands of the eastern part of the country. On this pass in early morning sun CEO was seeking context views of city and its surroundings. As ISS crossed the high mountains of the Hindu Kush from the NW, the crew was to look for this target to the left of track*), **Tin Bider Impact Crater** (*this relatively recent [70 million-year-old] impact is located in the desert of east central Algeria. The station pass was in mid-morning light. As ISS approached from the NW, the crew was to look for this 6km in diameter feature just right of track*), and **West Hawk Impact Crater** (*this 351 million year old impact site is about 2.5km in diameter and is marked by a small lake about 100km east of Winnipeg and 60km north of Lake of the Woods. The pass was late morning, the approach from the W. After crossing the city of Winnipeg the crew was to begin looking for this feature just right of track*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:01am EDT [= epoch]*):

Mean altitude -- 334.0 km

Apogee height -- 339.7 km

Perigee height -- 328.3 km

Period -- 91.21 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0008501

Solar Beta Angle -- -28.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in the last 48 hours -- 137 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49382

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/11/07 -- U.S. OGS (Oxygen Generation System) activation  
07/21/07 -- Thruster/reboost test of functionality of new Russian software (vers. 7.05)  
07/23/07 -- US EVA-9 (~11:00am EDT, est.)  
07/24/07 -- ISS reboost  
08/01/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/02/07 -- Progress M-61/26P launch  
08/05/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking  
08/19/07 -- STS-118/Endeavour/13A.1 undocking  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/??/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks [*under review*]  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch [*to be reviewed*]  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 [*to be reviewed*]  
02/12/08 -- Progress M-63/28P launch [*to be reviewed*]  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS

02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
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04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 07/05/07  
**Date:** Thursday, July 05, 2007 12:55:05 PM  
**Attachments:**

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**ISS On-Orbit Status 07/05/07**

All ISS systems continue to function nominally, except those noted previously or below.

Using the Russian MO-21 "Ecosfera" air sampler & incubation equipment, Fyodor Yurchikhin monitored the station's sanitary-hygiene status by conducting another 40-min. microbial analysis (T+2 days) on the air samples collected on 7/3 and incubated since then in the MO-21 equipment. *[MO-21 determines microbial contamination of the ISS atmosphere, specifically the total bacterial and fungal microflora counts and microflora composition according to morphologic criteria of microorganism colonies. The equipment, consisting of an air sampler set, a charger and power supply unit, provides samples to help determine microbial contamination of the ISS atmosphere, specifically the total bacterial and fungal microflora counts and microflora composition according to morphologic criteria of microorganism colonies.]*

Clay Anderson worked on the EMCS (European Modular Cultivation System), installing tubes on the water pumps for two RBLSS (Rotor Based Life Support System) modules, one on centrifuge rotor A, the other on rotor B. *[The 298-kg EMCS, delivered on ULF1.1, is a multi-purpose combination centrifuge/growth chamber with eight small research containers that allows plant growth experiments to be carried out in controlled partial and microgravity conditions and under controlled pressure, light, temperature and humidity conditions. The goal of these experiments is to enable growing plants in space that could serve as a basic nutrition source for astronauts on future long-duration missions to the Moon or Mars.]*

After having configured the Lab RWS (Robotics Workstation) and former Service Module (SM) PCS laptops yesterday to software (s/w) vers. R10 by installing R10

HDDs (hard disk drives), the FE-2 supported the ground in completing PCS (Portable Computer System) laptop s/w transitions. At this point, all four PCS laptops have the R10 s/w installed with the OGS patch, clearing the way to OGS activation (7/11). *[Today, Clay moved the former SM PCS to the Airlock and powered on both it and the Lab laptop. The ground then installed the OGS (Oxygen Generation System) s/w patch on all four of the R10 laptops, two at a time, starting with the Lab RWS and SM PCS. Afterwards, the PCS rebooted automatically, and Clay was then to shut down the ISP Health Monitor on the Lab and SM PCS and deactivate the A/L and Cupola laptops.]*

Oleg Kotov turned off the gas analyzer (GA) in the Soyuz TMA-10 spacecraft which has been active since 7/2.

Fyodor conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables. The CDR was also to transfer filtered condensate from U.S.-collected CWC (Contingency Water Container) to EDV container, as required, for the regular processing (“regenerating”) of KAV condensate water in the Russian water processing system (SRV-K2M) using the electric condensate pumping unit (BPK).

Clay conducted the weekly 10-min CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. The potable water transferred from the Shuttle (STS-117), put on temporary “hold” pending sample analysis on the ground, was cleared today for crew consumption. *[Updated “cue cards” based on the crew’s water callowns are sent up every other week.]*

In the SM, Anderson configured the video equipment for filming the subsequent workouts on the TVIS (Treadmill with Vibration Isolation & Stabilization), for biomechanical evaluation of the individual crewmembers and assessment of the hardware status by ground engineers. Later tonight, he’ll dismantle and stow the video equipment.

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later today, the FE-2 will transfer the crewmembers’ exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Anderson unstowed & set up the hardware for his second session with the NUTRITION experiment, which begins tomorrow with a blood draw and urine collection part, requiring Clay to forego exercising and food intake for eight hours, i. e., starting tonight. *[The 24-hour sample collection starts with the first void tomorrow morning and continues through the first void Saturday morning. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts, collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing in-flight samples (plus an additional postflight sample), made possible by the MELFI/Minus Eighty Degree Celsius Laboratory Freezer for ISS].*

In preparation for the next U.S. spacewalk, EVA-9, Anderson terminated the recharge of the first set of recently discharged EMU batteries in the A/L BSA (Airlock Battery Stowage Assembly) and initiated it on the second set. This completes all EVA preparation activities with regard to EMUs, METOX and batteries.

Clay Anderson checked out the U.S. Sound Level Meter (SLM) instrument and then used it to conduct the periodic noise level measurements program in the station interior for a 2-hr acoustic survey, including transfer of the recorded data to the MEC. *[A total of 48 acoustic measurements are obtained at 13 locations in the Lab (including in the TESS {Temporary Sleep Station} with door closed), three locations in the DC1 Docking Compartment, and 15 locations in the SM. The survey also includes three crew preference locations taken at their perceived loudest locations in the station. The SLM gives instantaneous noise levels and their frequency spectra, which are transferred to the MEC laptop via an RS232 cable and later downlinked with regular CHeCS (Crew Health Care Systems) data dump or via OCA.]*

A planned PAO/TV comm session by the crew with VIP visitors from Bavaria/Germany at TsUP/Moscow, including the Bavarian Minister of Economy Erwin Huber plus entourage, was called off by Huber due to other commitments. One focus was to have been on the German-developed Plasma-Crystal experiment on ISS.

At ~9:55am, FE-2 Anderson participated in a PAO/TV event with science and math students of Piedmont Elementary School in Charleston, WV, at the Clay Center for the Arts & Sciences in Charleston.

**KURS Test:** As part of the ongoing troubleshooting of the RS Terminal/Central (TVM/TsVM) computer lanes, RSC-Energia today also tested the SM KURS automated rendezvous & approach radio system (which shares a component with the TVM computer) to investigate any possible connection to the recent computer

failure. Today's test encountered a problem with KURS' 2<sup>nd</sup> string (preliminary indications are that this issue may be KURS-internal and not linked to the TVM). A KURS/thruster test is being planned as a functionality check of the new Russian software vers. 7.05 which will be loaded on TsVM & TVM shortly (restart on v7.05 planned on 7/16). Afterwards, installation of all bypass jumpers on the six lanes will be completed. After some operating time, the thruster test will be conducted tentatively on 7/21, before the next spacewalk, EVA-9. EVA-9 will be followed immediately by an altitude reboost, linked to the jettisoning of the 7A.1 EAS (Early Ammonia Servicer) of 1412 lb mass, with ~300 lb of ammonia & ~21 lb nitrogen).

News of the selection of the Russian Black Sea resort/spa town Sochi for the Winter Olympics 2014 was uplinked to the crew.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:44am EDT [= epoch]*):

Mean altitude -- 334.1 km  
Apogee height -- 339.9 km  
Perigee height -- 328.4 km  
Period -- 91.21 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0008516  
Solar Beta Angle -- -28.7 deg (magnitude leveling off)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in the last 48 hours -- 93 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49366

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/11/07 -- U.S. OGS (Oxygen Generation System) activation  
07/13/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
07/21/07 -- Thruster/reboost test of functionality of new Russian software (vers. 7.05) **[added]**  
08/01/07 -- Progress M-59/24P undocking (DC1) & reentry **[new date]**  
08/02/07 -- Progress M-61/26P launch **[new date]**  
08/05/07 -- Progress M-61/26P docking (DC1 nadir) **[new date]**  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/09/07 -- STS-118/Endeavour/13A.1 docking  
08/19/07 -- STS-118/Endeavour/13A.1 undocking  
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08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
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10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
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04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
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04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 07/04/07

**Date:** Thursday, July 05, 2007 7:59:18 AM

**Attachments:**

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### **ISS On-Orbit Status 07/04/07**

All ISS systems continue to function nominally, except those noted previously or below. *Independence Day holiday for all crews – on the ground & in space.*

Early at ~4:12am EDT, CDR Yurchikhin tagged up with ground specialists to discuss details of the plan for more Russian GFI-8 "Uragan" (hurricane) earth-imaging sessions.

FE-2 Anderson conducted the periodic status checkup & filter inspection of the running CSI (CGBA Science Insert)-4/5 payload of seed germination modules and nematode worms housed in the CGBA (Commercial Generic Bioprocessing Apparatus) incubator. *[The incubator is controlled from the ground with automatic video downlinked to Earth. Students in the U.S. and Malaysia are participating in educational activities in their classrooms while monitoring the growth in orbit.]*

Anderson also conducted the periodic (every two weeks) inspection of the RED (Resistive Exercise Device) with canister cords and accessory straps as well as the canister bolts for re-tightening if required.

Yurchikhin performed the daily routine maintenance of the SOZh environmental control & life support systems (ECLSS) in the SM, including ASU toilet facilities systems/replaceables

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Afterwards, Clay transferred the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*X2R6 Update:* Today was Day 3 of the X2R6 software (s/w) transition in the US segment (USOS). The ground loaded CCS (Command & Control System) vers. R6 to the standby C&C MDM (Command & Control Multiplexer/Demultiplexer) computer, reformatted the mass storage device and then loaded INTSYS R3 s/w to the backup INT (Interior) MDM. This completed the X2R6 uplink/transition procedure. All three C&C MDMs are now running CCS R6, both GNC (Guidance, Navigation & Control) MDMs are running GNC R6, and both INT MDMs are running INTSYS R3. There were no X2R6-related crew activities required today.

Today's (Crew Earth Observation) photo targets were **Tigris-Euphrates Delta** (*this complex, desert delta has been, and continues to be energetically modified by human activities. As ISS tracked SE-ward down the valley from Baghdad the crew had a nadir pass in clear weather and late afternoon sun. Trying for a detailed mapping of the western [Iraqi] side of the delta from the city of Al Basrah to just northeast of Kuwait City*), **Shortgrass Steppe, Colorado** (*this large target area is located near the Wyoming-Nebraska-Colorado border, and includes most of the area between the Rocky Mountains to middle South Platte River. It has been a Long Term Ecological Research [LTER] site since 1982, with the main interest being land use change. This pass was in fair weather with good morning light. As ISS approached the area from the SW, the crew was to try for overlapping context views of the region which lies mostly left of track*), and **Mullan-Buffalo** (*this target area consists roughly of the upper Missouri River Valley from E of Flathead Lake to W of Fort Peck Lake in north central Montana. The focus of this target is land use change. This pass was near nadir with clear weather expected in mid-morning sun. Trying for a mapping pass along the river between Flathead and Fort Peck Lakes*).

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<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:24am EDT [= epoch]*):

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Perigee height -- 328.5 km

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Eccentricity -- 0.00085  
Solar Beta Angle -- -28.7 deg (magnitude leveling off)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in the last 48 hours -- 78 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49350

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/11/07 -- U.S. OGS (Oxygen Generation System) activation (tent.)  
07/11/07 -- US EVA-9 **[new date]**  
07/13/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
07/16/07 -- Progress M-59/24P prop lines venting  
07/21/07 -- Progress M-59/24P undocking (DC1) & reentry  
07/22/07 -- Progress M-61/26P launch  
07/24/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking  
08/19/07 -- STS-118/Endeavour/13A.1 undocking  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
08/22/07 -- ISS reboost  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
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10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
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12/08/07 -- (NET) STS-122/Atlantis/1E docking  
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12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
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02/??/08 -- Russian EVA-20 *[to be reviewed]*

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04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
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05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 07/03/07  
**Date:** Tuesday, July 03, 2007 2:50:13 PM  
**Attachments:** [image001.emz](#)  
[image003.gif](#)  
[oledata.mso](#)

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### **ISS On-Orbit Status 07/03/07**

All ISS systems continue to function nominally, except those noted previously or below.

CDR Yurchikhin supported the Russian TEKh-20 Plazmennyi-Kristall/PK-3+ (Plasma Crystal-3+) experiment on its fifth day, first activating the turbopump in the Service Module (SM)'s Transfer Compartment (PkhO) for keeping the vacuum chamber (ZB) in the SM Work Compartment (RO) evacuated, then manually assisting with the semi-automated experiment. *[Main objective of PK-3 is to study dust plasma wave propagation and dispersion ratio at a specified power of an alternating electric field, pressure, and a varied number of particles, controlled by the experimenter. Today, the objective was to study the kinetics of the filamentary structures formed by 14.9  $\mu\text{m}$  particles as the value of the low frequency alternating electric field changed, then of the interaction of structures of 14.9  $\mu\text{m}$  & 3.4  $\mu\text{m}$  particles. Later, the penetration of 2.5  $\mu\text{m}$  particles through the 14.9  $\mu\text{m}$  structures was to be recorded. Afterwards, data were copied to USB stick for subsequent downlinking via OCA, and the hardware turned off.]*

FE-1 Kotov set up new Bubble dosimeters for recording radiation traces as an additional component of the Russian radiation payload suite "Matryoshka-R". *[Using Velcro, the panel with the Bubble dosimeter reader was attached at the Service Module (SM) work site (on panel 107) and equipped with its own MMC memory card. Of eight Bubble dosimeter detectors supplied, six were initialized and positioned at their exposure locations. The setup was photo-documented. The complex Matryoshka payload suite is designed for sophisticated radiation studies.]*

Starting a new round of the monthly preventive maintenance of Russian segment

(RS) ventilation systems, Kotov began in the FGB (*Funktsionalnyi-Grusovoi Blok*) for the regular cleanup of the detachable VT7 fan screen guards (grilles) of the Thermal Control System (TCS/SOTR)'s gas-liquid heat exchangers (GZhT4), then cleaned the four "Group B" fan screens (VT1, VTK1, VV1RO & VV2RO) in the SM, before moving on to work on the ventilation system in the DC1 (Docking Compartment), cleaning its PF1 & PF2 dust filter fans and V1 & V2 filter screens.

In the US segment (USOS), FE-2 Anderson supported the ongoing X2R6 software transition which, now in its second day (of three), has been going well so far. *[The ground today loaded the backup GNC (Guidance, Navigation & Control) and INT MDMs, then transitioned the primary C&C (Command & Control) MDM to Standby, which brought up the new primary C&C running the new R6 CCS (Command & Control System) software. Clay shut off the PCS (Portable Computer System) laptop (vers. R9) at the Lab RWS (Robotics Workstation) and turned on the PCS laptop at the Cupola RWS, newly loaded with R10 (and OGS patch), verifying its proper connection to the C&C MDM. The ground then was to transition to INTSYS R3 and GNC R6, finally loading GNC R6 to the backup GNC MDM. More activities are scheduled tomorrow, without crew actions required.]*

At 10:50am EDT, Russian thrusters performed a brief firing in support of GNC R6 transition. *[ISS attitude control was handed over to RS MCS (Motion Control System) at 10:45am and returned to US CMG momentum management at ~1:35pm. Attitude itself was not changed, remaining in XVV TEA (X-axis in Velocity Vector/Torque Equilibrium Attitude).]*

The FE-2 worked on the MELFI (Minus-Eighty Laboratory Freezer for ISS) rack, first checking the N<sub>2</sub> (nitrogen) pressure in the refrigerator, then retrieving seven Icepac belts from stowage and inserting them in cold trays of Dewar 3 for its later activation by the ground.

Yurchikhin collected the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Kotov used the standard ECOSFERA equipment, set up yesterday, to conduct microbial air sampling runs for the MedOps SZM-MO-21 experiment, with the POTOK Air Purification System temporarily powered down, taking samples from cabin surfaces along with samples from crewmembers for sanitation and disease studies. The sample tubes were then stowed in the Kriogem-03 refrigerator for eventual Earth return. *[The equipment, consisting of an air sampler set, a charger*

*and power supply unit, provides samples to help determine microbial contamination of the ISS atmosphere, specifically the total bacterial and fungal microflora counts and microflora composition according to morphologic criteria of microorganism colonies.]*

The CDR had another 2 hrs reserved for continuing the extensive troubleshooting of the German-built TVM (Terminal) and TsVM (Central) computers in the RS, using the "Elektronika MMTs-01" MultiMeter to make systematic resistance measurements on numerous connector contacts of TsVM & TVM control circuitry in a power socket, looking for discontinuous leads (perhaps corroded). *[Yurchikhin also took photographs of the BOK-3 Command Processing Unit to help determining number and condition of connectors and cables mated to the unit that would require replacement. Yesterday's resistance measurements on a section of cable isolated from the TsVM & TVM and the BOK-3 showed nominal readings for all leads except one. The crew also reported seeing corrosion on one of the BOK-3 panels and an unusual dark coloring around the plug for one connector. Photos were taken and down-linked for analysis.]*

In line with the CCS R6 software transition, Clay Anderson brought the Emergency and Warning SODF (Station Operations Data File) books up to date with new pages delivered on STS-117. *[The updated books must be deployed by the completion of the X2R6 transition. There are four EMER-1 books (deployed in SM, FGB, Lab, Soyuz), three EMER-2 books (SM, FGB, Lab), three Warning books (SM, FGB, Lab), and one POC (Portable Onboard Computers) book (Lab).]*

Clay Anderson had more time set aside for restowing EVA tools and equipment from the recent four 13A spacewalks.

After the IFM (inflight maintenance) on the RED (Resistive Exercise Device) performed by Sunita Williams on 5/25, Anderson today performed the standard Flexpac canister load calibration as required after cable replacements. *[The on-orbit calibration of the two Schwinn RED cans re-establishes the relationship of specific load settings with a specific number of pulls per setting, followed by recording of the load values measured with a calibration tool and steel handles from the on-orbit calibration kit. The calibration is done approximately every two months and after cable replacement to allow updating protocols as necessary and tracking hardware status.]*

The CDR performed the daily routine maintenance of the SOZh environmental control & life support systems (ECLSS) in the SM, including ASU toilet facilities systems/replaceables

The FE-1 updated/edited the standard IMS (Inventory Management System) "delta

file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew performed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

For their 1.5-hr. TVIS workout, Fyodor and Oleg today each conducted the standard Russian PFE test MO-3, their first, using the TVIS in unmotorized mode and wearing the Cardiokassette KK-2000 belt with three chest electrodes. *[The fitness test, controlled from the RSE-Med laptop, yields ECG (electrocardiogram) readings to the KK-2000 data storage device, later to be downlinked via U.S. OCA. Before the run, the KK-2000 was synchronized with the computer date/time readings. For the ECG, the crewmembers worked out on the treadmill, first walking 3 min. up to 3.5 km/h, then running at a medium pace of 6.5 km/h, followed by the maximum pace not exceeding 10 km/h, then walking again at gradually decreasing pace.]*

Later today, Oleg will copy the crewmembers’ exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Still on the Russian “time permitting” task list for Kotov and Yurchikhin is equipment auditing/inventorying in the RS.

At ~6:45am EDT, the crew conducted a PAO/TV comm session with students participating in a seminar on “Space Exploration: Theory and Practice” assembled at TsUP/Moscow. *[The seminar is being conducted from June 30 to July 10 at the Youth Space Center of Bauman MGTU (Moscow State Technical University) with the support of Roskosmos and the participation of students, post-graduate students from MGTU and other Russian universities as well as representatives of youth organizations for cosmonautics in other countries.]*

*Saturday Science Update:* A list of three suggested activities for the voluntary “Saturday Science” program on 7/7 was uplinked for Clay’s choice. His selection is required by tonight. *[The three choices are (1) a new run of CFE VG1 (Capillary Flow Experiment – Vane Gap 1), (2) EPO Hobbies Demo (how crewmembers spend some of their personal time on orbit), and (3) BCAT-3 (Binary Colloidal Alloy Test 3), using the CGBA-2 (Commercial Generic Bioprocessing Apparatus 2) powered up 12 hrs beforehand by the ground, to allow freeing some stuck mixing magnets within BCAT-3 to allow additional BCAT-3 science (BCAT-3 focuses on the dynamics of phase separation of a model critical fluid as a function of*

concentration).]

Today's CEO (Crew Earth Observation) photo targets were **Cairo, Egypt** (CEO is interested in documenting the rapid growth of a number of world cities. ISS imagery will be used for detecting and monitoring changes in the edges of urban areas. This pass in morning light found the center of Cairo to the left of track. As ISS approached the Egyptian capital from the SW, the crew was to use the long lens settings for a detailed, near-nadir mapping of the southeastern margins of this city beginning in the S at the Nile River), **Dundee Ice Cap, China** (the small glacier features of this ice cap are located at the eastern end of the Tergun Daba Mountains near the NE margin of the Qinghai-Tibetan Plateau of central China. They are prominent only on the N slopes on this E-W oriented range. This is a very arid continental region and ice persists at this latitude primarily because of the 16,500 to 17,500 ft elevations of the mountain crests. These glaciers are currently under field investigation by Ohio State University where core samples have been taken for paleo-climate studies. As ISS approached the edge of the Tibetan Plateau from the northwest, the crew was to try to spot the pattern of this target among numerous other snow-capped mountain ridges in the area. The pass was in afternoon sun and may not have been cloud-free. Trying for context views of the area with the 180mm lens or less and CEO researchers will try to spot the target for future passes), and **Yellowstone National Park, Wyoming** (CEO is monitoring this renowned park area for change due to fire and encroaching human activities. ISS approach was from the SW in high, late-morning sun. Looking just left of track and attempting to map in detail, with the long lens settings, the shoreline of Lake Yellowstone).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:01am EDT [= epoch]):

Mean altitude -- 334.3 km

Apogee height -- 340.0 km

Perigee height -- 328.6 km

Period -- 91.22 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008517

Solar Beta Angle -- -28.1 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49334

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/11/07 -- U.S. OGS (Oxygen Generation System) activation (tent.)  
07/11/07 -- US EVA-9 **[new date]**  
07/13/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
07/16/07 -- Progress M-59/24P prop lines venting  
07/21/07 -- Progress M-59/24P undocking (DC1) & reentry  
07/22/07 -- Progress M-61/26P launch  
07/24/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking  
08/19/07 -- STS-118/Endeavour/13A.1 undocking  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
08/22/07 -- ISS reboost  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking

04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

Have a Good and Happy Fourth of July Holiday!

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/02/07  
**Date:** Monday, July 02, 2007 2:21:16 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 07/02/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 11 of Increment 15.*

Today's crew activity began with the routine checkup of Docking Compartment (DC1) circuit breakers and fuses by FE-1 Kotov. *[The monthly checkup in the "Pirs" DC1 looks at AZS circuit breakers on the BVP Amp Switch Panel (they should all be On) and the LEDs (light-emitting diodes) of 14 fuses in Fuse Panels BPP-30 & BPP-36.]*

CDR Yurchikhin supported the Russian TEKh-20 Plazmennyi-Kristall/PK-3+ (Plasma Crystal-3+) payload on its fourth day by activating the turbopump in the Service Module (SM)'s Transfer Compartment (PkhO) for keeping the vacuum chamber (ZB) in the SM Work Compartment (RO) evacuated and manually conducting the experiment. *[Today, Fyodor was to generate a homogeneous plasma-dust cloud in the ZB using incremental reduction of RF (radio frequency) generator power, in three individual attempts (two with particles 1.55  $\mu\text{m}$  in diameter, one attempt with 6.81  $\mu\text{m}$  particles). The experiment was conducted in semi-automated mode. Afterwards, data were copied and downlinked from the hard drive, and the hardware turned off. The turbopump will be deactivated tonight at ~5:25pm EDT. Main objective of PK-3 is to study dust plasma wave propagation and dispersion ratio at a specified power of HF (high frequency) discharge, pressure, and a varied number of particles. The plasma, i.e., fine particles (1.55  $\mu\text{m}$  & 6.8  $\mu\text{m}$ ) in neon, is charged and excited by HF radio power inside the evacuated work chamber. PK-3+ has more advanced hardware and software than the previously used Russian PKE-Nefedov payload.]*

Oleg Kotov had two hours allotted for unstowing and setting up the equipment for the BTC-10 CARDIOCOG experiment, then performing the procedure on himself. *[CARDIOCOG studies changes in the human cardiovascular system in micro-G,*

*expressed in the peripheral arteries, and the vegetative regulation of arterial blood pressure (BP) and heart rate (HR) plus ECG (electrocardiogram). For the experiment, Oleg had to take his systolic & diastolic blood pressure measurements, heart rate data and ECG, using a finger cuff, the Cardionauka CAR 01 kit with PTP-10 Portapress power, an electrode vest, and the TENZOPLUS sphygmomanometer. He then stored the data on the RSE1 laptop for subsequent copying to a PCMCIA card and downlinking to the ground via OCA. The hardware was restowed.]*

In preparation for the periodic microbial air sampling session scheduled tomorrow, Kotov first installed and activated the Kriogem-03 refrigerator, then unstowed and set up the MedOps SZM-MO-21 ECOSFERA equipment, and initiated charging the Ecosphere power pack (BP). *[The equipment, consisting of an air sampler set, a charger, power supply unit, and incubation tray for Petri dishes, determines microbial contamination of the ISS atmosphere, specifically the total bacterial and fungal microflora counts and microflora composition according to morphologic criteria of microorganism colonies.]*

FE-2 Anderson worked on the contents of MELFI (Minus-Eighty Laboratory Freezer for ISS), reconfiguring and consolidating frozen Ziploc containers with urine samples from the NUTRITION experiment in one of the box modules, in order to conserve space and facilitate future insertions (also to help with more efficient future packing of the Double Coldbag for return to Earth).

FE-1 Kotov assisted in the reactivation of the Elektron O<sub>2</sub> generator at 32 amps, monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. Next deactivation is scheduled for 7/13. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

CDR Yurchikhin reconfigured the IMV (inter-modular ventilation) system between the FGB GA (Pressurized Adapter) and the Soyuz TM-10/14S to its nominal state by disconnecting and securing the soft air ducts. *[This involved disconnecting the BVN fan/heater assembly and repositioning it, rerouting an end of the air duct, repositioning a blower unit, readjusting its grounding strap, etc.]*

Later, Oleg Kotov activated the gas analyzer (GA) in the Soyuz TMA-10 spacecraft, to run for a few days.

In preparation for the next U.S. spacewalk, EVA-9 on 7/20, Anderson initiated the recharge of the first set of recently discharged EMU batteries in the A/L BSA

(Airlock Battery Stowage Assembly).

Afterwards, working several hours in the A/L, with the CCAA air conditioner activated by the ground, Fyodor and Clay reconfigured their EMU spacesuits for the EVA-9. *[EMUs #3008 & #3006 were resized for their use, and the #3008's helmet, slated for return on STS-118, was swapped with the helmet from EMU #3018, with lights installed.]*

The FE-1 continued the extensive troubleshooting of the TVM (Terminal) and TsVM (Central) computers of the RS (Russian Segment), using the "Elektronika MMTs-01" MultiMeter to make systematic resistance measurements on several dozens of connector contacts of TsVM & TVM control circuitry in a power socket, looking for discontinuous leads (perhaps corroded).

At the HRF1 (Human Research Facility 1) rack, Clay Anderson deactivated the MedOps cardiac defibrillator and conducted its periodic checkout. (Last time done: 5/3/07). *[This routine maintenance task is scheduled as soon as possible from Expedition start and every 60 days thereafter. For the checkout, the defib is connected to the 120V outlet, equipped with its battery (today #1919) and then allowed to charge, for about five seconds, to a preset energy level (e.g., 100 joules). After the button-triggered discharge, a console indicator signals success or failure of the test. The pacing signal is downlinked via S-band for 1 min. To check on possible aging of the CRT (cathode ray tube) display screen, today's maintenance included photo documentation by Clay. The HRF was afterwards powered down.]*

At ~5:30am EDT, the FE-2 conducted a teleconference with ground specialists on packing plans for the next Shuttle visit, then had ~1.5 hours reserved for initial hardware gathering and prepacking for return on 13A.1/Endeavour next month.

Oleg meanwhile performed the daily routine maintenance of the SOZh environmental control & life support systems (ECLSS) in the SM, including ASU toilet facilities systems/replaceables

Later, Kotov also updated/edited the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew performed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later today, Oleg will copy the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

As a voluntary job item for Kotov and Yurchikhin, a 30-min task of auditing/inventorying in the RS has been added to the Russian "time permitting" task list.

*USOS Software Step-up:* The software transition of several U.S. MDMs (Multiplexer/Demultiplexers) is proceeding nominally. The activities last three days and include the uplink of the CCS (Command & Control System) R6, GNC (Guidance, Navigation & Control) R6 and INTSYS R3 software, as well as the transition of the PCS (Portable Computer System) laptops to R10, including an OGS (Oxygen Generation System) patch. Pending successful completion on Wednesday, OGS activation is scheduled for 7/11. Today, MCC-H loaded the backup and standby C&C MDMs with CCS R6 software. Crew participation was not required.

*RS Software Step-up:* The Russian software upgrade to version 7.05 is tentatively planned for 7/9, pending the current TsVM/TVM troubleshooting and review by the IMMT (ISS Mission Management Team).

*SSRMS Lights:* As shown by an SSRMS (Space Station Remote Manipulator System) lights inspection on 6/29, the Tip LEE (Latching End Effector) camera light (two bulbs) is failed. Both the Tip Elbow and Base Elbow cameras have one (of two) bulbs failed. There is one spare CLA (Camera/Light Assembly) on orbit. CSA/Robotics experts are working the issue. The loss of the Tip LEE light is considered to have very little operational impact.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this noon, 12:48pm EDT [= epoch]):

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Perigee height -- 328.6 km

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Eccentricity -- 0.000861  
Solar Beta Angle -- -26.9 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in the last 48 hours -- 100 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49322

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/11/07 -- U.S. OGS (Oxygen Generation System) activation (tent.)  
07/13/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
07/16/07 -- Progress M-59/24P prop lines venting  
07/20/07 -- US EVA-9  
07/21/07 -- Progress M-59/24P undocking (DC1) & reentry  
07/22/07 -- Progress M-61/26P launch  
07/24/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking  
08/19/07 -- STS-118/Endeavour/13A.1 undocking  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
08/22/07 -- ISS reboost  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
[*under review*]  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch [*to be reviewed*]  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 [*to be reviewed*]  
02/12/08 -- Progress M-63/28P launch [*to be reviewed*]

02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 07/01/07  
**Date:** Sunday, July 01, 2007 12:32:46 PM  
**Attachments:**

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### **ISS On-Orbit Status 07/01/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Clay Anderson). Ahead: Week 11 of Increment 15.*

CDR Yurchikhin supported the Russian TEKh-20 Plazmennyi-Kristall/PK-3+ (Plasma Crystal-3+) payload for the third day by activating the turbopump in the Service Module (SM)'s Transfer Compartment (PkhO) for keeping the vacuum chamber (ZB) in the SM Work Compartment (RO) evacuated. The experiment itself is conducted in automated mode ("Telescience"). The turbopump will be deactivated tonight at ~5:25pm EDT. *[Main objective of PK-3 is to study dust plasma wave propagation and dispersion ratio at a specified power of HF (high frequency) discharge, pressure, and a varied number of particles. The plasma, i.e., fine particles (6.8 μm) in neon, is charged and excited by HF radio power inside the evacuated work chamber. PK-3+ has more advanced hardware and software than the previously used Russian PKE-Nefedov payload.]*

FE-1 Kotov performed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM) and the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Kotov also gathered the weekly data on total operating time & "On" durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

FE-2 Anderson completed his first CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS) session, started yesterday as "Saturday Science", by downloading data from his two CCISS Actiwatches and Holter harness to the HRF (Human Research Facility) rack laptop, then stowing the equipment. *[CCISS*

*studies the effects of long-duration spaceflight on crewmembers' heart functions and their blood vessels that supply the brain (=“cerebrovascular”). Learning more about the changes in cardiovascular & cerebrovascular systems in zero-G could lead to specific countermeasures that might better protect future space travelers. This weekend’s two-day activities featured hardware set-ups including the Holter harness for heart rate monitoring (with PCMCIA card), the CBPD (Continuous Blood Pressure Device) cuffs, and two Actiwatches (not the same as for SLEEP) and passive data collection. For the Baro study of CCIS, heart rate and blood pressure were recorded for resting and timed breathing for 5 min. The 24-hr passive data collection period begun yesterday ended today. POIC (Payload Operation & Integration Center) to Clay: “Thanks for volunteering to perform CCISS on your weekend and working through lunch to get it done! This is the first time that CCISS data has been collected on-orbit so the PI team is ecstatic. You also hold the ISS record for wearing the most Actiwatches.”]*

Working off the Russian voluntary task list, Fyodor Yurchikhin conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature. *[Today’s Uragan photo targets were oil contamination in the Caspian Sea, the coastal line of the Aral Sea, Greece, lakes at the northern part of the river Danube flowing around Izmail, the Katunsky preserve at the bend of the Katun river, the Ugra National Park, woodlands of Central Russia, the Eastern bank of the Volga river to the south of Saratov, Pamir glaciers to the left of track, and the RGO & Medvezhyh Glaciers.]*

As a second discretionary task list item, Oleg Kotov completed another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Sony PD-150P camcorder from SM window #7 to record imagery of color fields of highly productive water areas, hydrodynamic phenomena and cloud cover pattern on the flight path. Obtained data will be used to assess seasonal changes in the mentioned water areas and atmospheric conditions under which they were observed. *[Photo targets in the Northern Atlantic were the Panama coast, Caribbean Sea, Haiti, Ireland, the St. Lawrence Gulf, Newfoundland Island, and the Bay of Biscay.]*

The crew performed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

The Elektron-VM O<sub>2</sub> (oxygen) generator remains off, and cabin air refreshes are

being performed from Progress M-59/24P storage (SrPK) as required. *[Due to the avionics maintenance activities this week the BITS2-12 onboard telemetry measurement system must be off, which in turn requires the Elektron to be deactivated. Turning Elektron on and off every time would impact its component service life.]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 9:17am EDT [= epoch]):*

Mean altitude -- 334.5 km  
Apogee height -- 340.2 km  
Perigee height -- 328.8 km  
Period -- 91.22 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.000842  
Solar Beta Angle -- -25.3 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in the last 48 hours -- 100 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49304

**Significant Events Ahead** *(all dates Eastern and subject to change):*

07/13/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
07/16/07 -- Progress M-59/24P prop lines venting  
07/20/07 -- US EVA-9  
07/21/07 -- Progress M-59/24P undocking (DC1) & reentry  
07/22/07 -- Progress M-61/26P launch  
07/24/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking  
08/19/07 -- STS-118/Endeavour/13A.1 undocking  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
08/22/07 -- ISS reboost  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/30/07  
**Date:** Saturday, June 30, 2007 11:30:52 AM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 06/30/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 15 crew CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Clay Anderson, except for regular maintenance & voluntary work.*

CDR Yurchikhin supported the Russian TEKh-20 Plasma Crystal-3+ (Plazmennyi-Kristall/PK-3+) payload on its second day by activating the turbopump in the Service Module (SM)'s Transfer Compartment (PkhO) for keeping the vacuum chamber (ZB) in the SM Work Compartment (RO) evacuated. The turbopump will be deactivated tonight at ~5:25pm EDT. *[Main objective of PK-3 is to study dust plasma wave propagation and dispersion ratio at a specified power of HF discharge, pressure, and a varied number of particles.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, Fyodor and Oleg also performed preventive maintenance cleaning on SM fans & grilles VPkhO, VdPrK, VPrK and FS9, and on the V3 ventilator grill in the DC1 (Docking Compartment).

For FE-2 Clay Anderson, it was Day 1 of the two-day activities of the HRF CCISS (Human Research Facility/Cardiovascular & Cerebrovascular Control on Return from ISS) experiment, Clay's chosen "Saturday Science" program. FE-1 Kotov

assisted with electrode placement and documentary photography. *[CCISS studies the effects of long-duration spaceflight on crewmembers' heart functions and their blood vessels that supply the brain (=“cerebrovascular”). Learning more about the changes in cardiovascular & cerebrovascular systems in zero-G could lead to specific countermeasures that might better protect future space travelers. Today’s activities focus on hardware set-ups including the Holter harness for heart rate monitoring (with PCMCIA card), the CBPD (Continuous Blood Pressure Device) cuffs, and two Actiwatches (not the same as for SLEEP). For the Baro study of CCIS, heart rate and blood pressure were recorded for resting and timed breathing for 5 min. Between today and tomorrow, there is also a 24-hr passive data collection period. There is no exercise allowed prior to the Baro study.]*

At ~9:30am EDT, the crew conducted their regular WPC (weekly planning conference) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Anderson filled out the regular FFQ (Food Frequency Questionnaire), his first, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Working off the Russian voluntary task list, Fyodor Yurchikhin conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature. *[Today’s Uragan photo targets were the Katun range in the bend of Katun river, Lake Teletsk, Yenisey up to the Saian-Shushenskoye water reservoir, the Irkut river valley, the Baikal coast from Irkut river to Angara, river valleys of Siberia, the Amur river valley, the Sikhote-Alinsky natural preserve, Main Caucasus mountain range, Stavropol region and Kalmykia Steppe landscapes in dry season, the Northern Caspian Sea area, the Ugra National Park Ugra, woodlands of Central Russian, Y. Gagarin’s landing site, a steppe fragment on the eastern bank of Volga river, dust storm at Aral Sea (if occurring), river valleys of Kirghizia, the Pamir mountain range with detailed views of RGO & Medvezhy Glaciers stretching to the west of Fedchenko Glacier, Tien-Shan with the two largest southern and northern converging glaciers, the south of Lake Baikal, detailed views of river valleys flowing from Khaman-Daban Range to the south towards the lake, Sakhalin Island, Greece, the town of Aleksandrovka, the Volga delta, Kaluga, and the Ugra valley.]*

As a second discretionary task list item, Oleg used the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

The crew performed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO cycle with bungee cord load trainer (CDR, FE-1).

Later today, Clay will transfer the crewmembers' exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The Russian crewmembers had their weekly PFCs (Private Family Conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop), Fyodor at 7:10am, Oleg at 8:00am.

At ~5:50am EDT, the crew downlinked PAO/TV greetings and congratulations to Mikhail Timofeyevich Kalashnikov on the 60<sup>th</sup> Anniversary of his invention of the Kalashnikov assault rifle. *[“...From here, from a height of the orbit through windows of our station we can clearly see how small and vulnerable our common home planet Earth looks. We must protect it not only from man-made disasters but also from military conflicts and terrorists threats. We are for peaceful space and for peace on Earth. But unfortunately, a complete disarmament is just an impossible dream for mankind. The reality is that only reliable weapons like your assault rifle, Mikhail Timofeyevich, can guarantee peace...”]*

The Elektron-VM O<sub>2</sub> (oxygen) generator remains off, and cabin air refreshes are being performed from Progress M-59/24P storage (SrPK) as required. *[Due to the avionics maintenance activities this week the BITS2-12 onboard telemetry measurement system must be off, which in turn requires the Elektron to be deactivated. Turning Elektron on and off every time would impact its component service life.]*

*Correction:* The 800A battery exchanged in the FGB yesterday was the #5 unit, not #2. Also replaced was BUPT-2.

### **Weekly Science Update** (*Expedition Fifteen -- 10<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* PCMCIA

(Personal Computer Memory Card International Association) card exchange performed on 6/26. ALTEINO is performing nominally according to latest information..

*ANITA*: Planned.

*BCAT (Binary Colloidal Alloy Test)*: Reserve.

*CARDIOCOG-2*: Planned.

*CFE (Capillary Flow Experiment)*: Reserve.

*CHROMOSOME-2 (E14 SFP)*: Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus)*: In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2)*: In support for BCAT-3 only.

*EarthKAM (Earth Knowledge Acquired by Middle School Students)*: Complete.

*EMCH (Elastic Memory Composite Hinge)*: Complete.

*EPO (Educational Payload Operation) Kit C*: Planned.

*IMMUNO (Saliva Sampling)*: Planned.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*: Complete.

*MISSE (Materials ISS Experiment)*: Ongoing.

*MTR-2 (Russian radiation measurements)*: Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1*: Planned

*MUSCLE (E14 SFP)*: Completed.

*MSG-SAME (Microgravity Science Glovebox)*: Planned.

*NEOCYTOLYSIS (E14 SFP)*: Completed.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION:* “Clay: Great job on the blood draw! We had confidence that you would do well, especially after seeing your last training session with Tyler. Thanks for making us look good. Your next session will be at the end of next week. We’re looking forward to seeing the next blood draw. It will make a great training tool in the future. –The Nutrition team.”

*SAMPLE:* Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* In progress.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 6/26 the ground has received a total of 5,201 CEO images for review and cataloging for Increment 15 (nearly 1000 frames just this week). “This past week we have received and are cataloging imagery with times corresponding to the following CEO targets: Bigach Impact Crater, Kazakhstan; and the Karakoram valley glacier area on the India-China border. A striking image from earlier in your increment of Patuxent River Naval Air Station, Maryland (Pax River) will be published on NASA/GSFC’s Earth Observatory Website this weekend. Thanks for your high interest in our payload!”

Today’s CEO (Crew Earth Observation) photo targets were **Tenoumer Impact Crater** (*this young impact site is situated in northern Mauritania north of the large, circular landmark feature known as the Richat Structure. It is small, only 1.9-km in diameter and just 10 thousand years old. This pass approached from the SW in mid-morning sun. After noting Richat, the crew was to begin looking just right of track, trying to get an 800mm view of this feature*), **Upheaval Dome Impact Crater** (*this interesting impact site is located in the Canyonlands area of southeastern Utah. This impact is 10-km in diameter and estimated to be 170 million years old. This pass was in late morning sun, with the crater near nadir. After crossing the Grand Canyon the crew was to look for the target with the 800mm lens*), and **Niwot Ridge Tundra, Colorado** (*this is one of many Long Term Ecological Research*

*[LTER] sites in North America. Niwot Ridge is located approximately 35 km west of Boulder, Colorado, with the entire study site lying above 3000 m elevation. There is a cirque glacier (Arikaree Glacier), extensive alpine tundra, a variety of glacial landforms, glacial lakes and moraines, cirques and talus slopes, patterned ground, and permafrost. The research area is bounded on the west by the Continental Divide, with runoff on the two sides being destined for the Colorado and Mississippi Rivers. On this pass the crew was to try for context mapping views only in late morning sun, looking just right of track).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:01am EDT [= epoch]*):

Mean altitude -- 334.6 km

Apogee height -- 340.2 km

Perigee height -- 329.1 km

Period -- 91.22 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008225

Solar Beta Angle -- -23.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 85 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49286

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/13/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

07/16/07 -- Progress M-59/24P prop lines venting

07/20/07 -- US EVA-9

07/21/07 -- Progress M-59/24P undocking (DC1) & reentry

07/22/07 -- Progress M-61/26P launch

07/24/07 -- Progress M-61/26P docking (DC1 nadir)

08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/09/07 -- STS-118/Endeavour/13A.1 docking

08/19/07 -- STS-118/Endeavour/13A.1 undocking

08/21/07 -- STS-118/Endeavour/13A.1 landing

08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*

08/22/07 -- ISS reboost

09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1) & reentry

10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/29/07  
**Date:** Friday, June 29, 2007 1:41:36 PM  
**Attachments:**

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### **ISS On-Orbit Status 06/29/07**

All ISS systems continue to function nominally, except those noted previously or below.

The three crewmembers performed the Russian biomedical routine assessments of PZeh-MO-7/Calf Volume Measurement and PZeh-MO-8/Body Mass Measurement (4<sup>th</sup> time for CDR & FE-1, 1<sup>st</sup> for FE-2), using the IM mass measurement device which Oleg Kotov afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference pints, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

CDR Yurchikhin conducted his first experiment session with the Russian TEKh-20 Plasma Crystal-3+ (Plazmennyi-Kristall/PK-3+) payload. After activating the turbopump in the Service Module's Transfer Compartment (SM PkhO), he started the evacuation of the vacuum chamber (ZB) in the SM Work Compartment (RO), then monitored the automated PK-3 operations. The run was terminated after two hours and the accumulated data transferred from hard disk to USB stick for subsequent downlinking. The turbopump will be deactivated tonight at ~5:25pm EDT. *[The activities were supported by ground specialist tagup. The experiment is performed on plasma, i.e., fine particles (6.8 μm) in neon charged and excited by HF (high frequency) radio power inside the evacuated work chamber. Main objective is to study dust plasma wave propagation and dispersion ratio at a specified power of HF discharge, pressure, and a varied number of particles.]*

FE-2 Anderson started Part 3 (of 5) of the periodic acoustic measurement protocol by recording post-sleep data of the crew-worn acoustic dosimeters, later deploying the dosimeters statically in the station for the duration of the day, then recording their measurements this afternoon (~2:40pm) and stowing the instruments.

*[Acoustic data must be taken twice per Increment, each time for the duration of the 16-hour crew workday.]*

Yurchikhin serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The regen process will be terminated at ~5:10pm EDT. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

The CDR also completed a major IFM (In-flight Maintenance) in the FGB by removing a failed Blok 800A storage battery (#2) and its BUPT-2 current converter control unit, replacing them with new spares. *[Each of the 800A batteries has its own ZRU charge/discharge unit, which tracks 49 battery parameters and is designed to increase the operating life of the battery by setting up charging and discharging modes. Each ZRU is comprised of one battery current converter (PTAB), one PTAB control unit (BUPT), and three charge/discharge current integrators (MIRT-3). The ZRU charge/discharge unit #2 was deactivated by TsUP/Moscow beforehand and later reactivated. Battery #2 is currently being conditioned in Cycle mode. This restores the full set of six FGB batteries to operation.]*

Clay Anderson set up and started the periodic scrubbing of the recently used EMU (Extravehicular Mobility Unit) and Airlock (A/L) cooling water loops, by initiating their ionic and particulate filtration. After the scrubbing, which took several hours, the operation was terminated. *[Purpose of the scrubbing, including iodination of the LCVGs (Liquid Cooling & Ventilation Garments) for biocidal maintenance, is the elimination of any biomass and particulate matter that may have accumulated in the loops. The A/L CCAA (Common Cabin Air Assembly) air conditioner is activated from 3:15am - 5:00pm to support the EMU activities in the A/L.]*

FE-1 Kotov continued the extensive troubleshooting of the TVM (Terminal) and TsVM (Central) computers of the RS (Russian Segment), using the "Elektronika MMTs-01" MultiMeter to make systematic resistance measurements on several dozens of connector contacts of TsVM & TVM control circuitry in the BOK-3 command processing unit.

Anderson prepared for next week's transition to the new U.S. R6 software by setting up and pre-staging the new 13A-delivered PCS HDDs (Portable Computer System Hard Disk Drives) with the R10 software, which includes an OGS (Oxygen

Generation System) patch. *[HDD #1149 was installed in the Cupola RWS (Robotic Workstation) laptop, HDD #1150 in the A/L PCS. Two more HDDs (#1157, #1177) were temp stowed near the Lab RWS laptop and near the SM PCS, as was the A/L laptop. The Cupola RWS laptop was connected to power and data but left unpowered. In preparation for the R6 transition, MCC-H yesterday successfully uplinked the new CCS (Command & Control System) files to the primary C&C MDM (Command & Control Multiplexer/Demultiplexer)'s mass storage device.]*

The FE-2 performed the periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[Purpose of the 10-min. activity is to correlate the hand-held readings with MCA (Major Constituents Analyzer) measurements. Two CSA-CP (CSA-Combustion Products) instruments recorded O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post (#1057, prime) and in the Node (#1060, backup), while the CSA-O<sub>2</sub> units (#1056, #1059) looked for O<sub>2</sub> in the Lab and the CDMK (#1007) for CO<sub>2</sub> in SM and Lab. Also recorded were battery ticks. The instruments were turned off afterwards, except for the prime CSA-CP #1057 unit, and returned to their regular locations.]*

Clay completed the regular bi-weekly maintenance reboot of the OCA SSC (Station Support Computer) Comm Router laptop.

Oleg Kotov performed the daily routine maintenance of the SOZh environmental control & life support systems (ECLSS) in the SM, including ASU toilet facilities systems/replaceables

Fyodor Yurchikhin updated/edited the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

At ~4:35am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~5:05am EDT, Fyodor and Oleg linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Discussions today concerned numerous equipment stowage discrepancies in connection with the recent NVM Navigation Computer Module software upgrade, a past FGB inventory audit, crew plans & suggestions for*

*future RS ISS audits, etc.]*

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio is timelined later at ~3:40pm.

Afterwards, at ~4:15pm, the crew will convene for their weekly teleconference with ISS Program Management at JSC/Houston via S-band/audio.

Also, at ~4:45pm, the crew will hold a discretionary "crew choice" event via S-band/audio and Ku-band/video (STS-117 Plaque hanging).

Clay Anderson had another "free" hour set aside on his timeline for ISS familiarization & adaptation, to help in adjusting to his new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

The crew performed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (CDR, FE-2), and VELO cycle with bungee cord load trainer (FE-1).

Later today, Clay will transfer the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

As a voluntary task item added to Anderson's "job jar" job list, Clay was to check out the locked-up EXPRESS Rack 4 (ER4) laptop performing the ALTEA CPU (Anomalous Long Term Effects on Astronauts/Central Processing Unit) lockup procedure.

The Elektron-VM O<sub>2</sub> (oxygen) generator remains off, and cabin air refreshes are being performed from Progress M-59/24P storage (SrPK) as required. *[Due to the avionics maintenance activities this week the BITS2-12 onboard telemetry measurement system must be off, which in turn requires the Elektron to be deactivated. Turning Elektron on and off every time would impact its component service life.]*

Today's CEO (Crew Earth Observation) photo targets were **Oasis Impact Crater, Libya** (*Oasis impact crater is 18 km in diameter and is dated at less than 120 million years. The crater should have been close to directly under ISS orbit track*), **Nile River Delta** (*the Nile delta is another of CEO long term monitoring sites.*

Observers are interested in documenting the state of the vegetation in the delta and the margins between agriculture and urban use. The Nile delta is currently facing erosion on its outer edges and some coastal lagoons have had increasing salinity levels. This is also a good target to practice using the 400 mm lens with the doubler. ISS should have passed almost directly over the delta), **Jamestown, Virginia** (even though the 400<sup>th</sup> anniversary of the founding of Jamestown was in May, there is still interest in imagery of this historic site. Jamestown was first permanent English settlement in America. It is located in the present-day James City county, on an island in the James River, southeast of Richmond Virginia), **Virginia Coast Reserve, Virginia** (the main objective from the standpoint of CEO for all of these sites is a record of land cover/land use change on a seasonal basis. Sun glint opportunities are also useful for drainage network mapping. Research activities of the VCR/LTER focus on the mosaic of transitions and steady-state systems that comprise the barrier-island/lagoon/mainland landscape of the Eastern Shore of Virginia. Primary study sites are located on Hog Island, Parramore Island and mainland marshes near Nassawadox, VA. The orbit track took the crew over the center of this target site), **Yellowstone National Park, Wyoming** (CEO is documenting the health and extent of the vegetation in Yellowstone National Park. Context views of the park vegetation are requested), and **Johnston Island reef, central Pacific** (Johnston Atoll is approximately 1400 km southwest of Hawaii. There are four islands on the reef platform and Johnston is the largest of the islands. While the reef does not encircle the island, the reef that does exist is visible on the northwest side of the island. CEO is documenting the condition of the reefs in the Pacific.)

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 10:24am EDT [= epoch]):

Mean altitude -- 334.7 km

Apogee height -- 340.3 km

Perigee height -- 329.2 km

Period -- 91.23 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008276

Solar Beta Angle -- -20.7 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 80 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49273

**Significant Events Ahead** (*all dates Eastern and subject to change*):

- 07/13/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)
- 07/16/07 -- Progress M-59/24P prop lines venting
- 07/20/07 -- US EVA-9
- 07/21/07 -- Progress M-59/24P undocking (DC1) & reentry
- 07/22/07 -- Progress M-61/26P launch
- 07/24/07 -- Progress M-61/26P docking (DC1 nadir)
- 08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3
- 08/09/07 -- STS-118/Endeavour/13A.1 docking
- 08/19/07 -- STS-118/Endeavour/13A.1 undocking
- 08/21/07 -- STS-118/Endeavour/13A.1 landing
- 08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*
- 08/22/07 -- ISS reboost
- 09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)
- 10/01/07 -- Progress M-61/26P undocking (DC1) & reentry
- 10/02/07 -- Soyuz TMA-11/15S launch
- 10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)
- 10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing
- 10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*
- 10/20/07 -- (NET) STS-120/Discovery/10A docking
- 10/22/07 -- (NET) Node 2 relocation
- 10/29/07 -- (NET) STS-120/Discovery/10A undocking
- 11/06/07 -- US EVA-10
- 11/14/07 -- US EVA-11
- 11/20/07 -- US EVA-12
- 12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite
- 12/08/07 -- (NET) STS-122/Atlantis/1E docking
- 12/12/07 -- Progress M-62/27P launch *[to be reviewed]*
- 12/13/07 -- (NET) STS-122 undocking
- 12/14/07 -- Progress M-62/27P docking
- ??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)
- ??/??/08 -- ATV-1 docking (SM aft port)
- 02/??/08 -- Russian EVA-20 *[to be reviewed]*
- 02/12/08 -- Progress M-63/28P launch *[to be reviewed]*
- 02/14/08 -- Progress M-63/28P docking
- 02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS
- 02/16/08 -- (NET) STS-123/Endeavour/1J/A docking
- 02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking
- 04/04/08 -- ATV-1 undocking (from SM aft port)
- 04/07/08 -- Progress M-63/28P undocking

04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/28/07  
**Date:** Thursday, June 28, 2007 12:52:49 PM  
**Attachments:**

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**ISS On-Orbit Status 06/28/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, Clay Anderson began Part 1 (of 5) of the periodic acoustic measurement protocol by deploying crew-worn acoustic dosimeters, to be carried for 24 hours (with a microphone on the shirt collar). (Last time done: 4/25). *[Tonight, after about 15 hours of measurements, dosimeter data will be downloaded and the hardware power-cycled for another data take starting tonight after 8.5-hr. sleep. At that point, the crew will deploy the dosimeters statically in the station for the duration of the day, record measurements tomorrow noon and stow the instruments. Acoustic data must be taken twice per Increment, each time for the duration of the 16-hour crew workday.]*

Also before breakfast and exercise, CDR Yurchikhin, FE-1 Kotov and FE-2 Anderson completed their second (Clay's first) session with the periodic Russian MedOps test "Hematokrit" (MO-10), which measures red blood cell count. (Last time done: 4/25). *[The blood samples were drawn from a finger with a perforator lancet, then centrifuged in two microcapillary tubes in the M-1100 kit's minicentrifuge, and its hematocrit value was read off the tubes with a magnifying glass. It is a well-known phenomenon of space flight that red blood cell count (normal range: 30-45%) tends to go down over time. After the exam, the data were saved in the IFEP software (In-Flight Examination Program) on the MEC (Medical Equipment Computer), and Oleg Kotov stowed the equipment.]*

Fyodor Yurchikhin started the periodic regeneration of the Russian Harmful Impurities Removal System (BMP) by initiating the "bake-out" cycle to vacuum on absorbent bed #1 of the dual-channel filtration system. The bake-out will be terminated at ~3:35pm EDT. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted*

*only during crew awake periods.]*

The two Russian crewmembers each completed the 2.5-hr Part 2 of their first onboard "Profilaktika" (MBI-8, "Countermeasures") preventive health maintenance fitness test series, including ECG (Electrocardiogram), blood tests and subjective rating. *[Today's fitness test was performed on the TVIS treadmill in unmotorized (idle) mode, with free choice of speeds within the range permitted. The test differs from the normal TVIS session by the use of the TEEM-100 gas analyzer (via a mask equipped with a pneumotachometer sensor), measurement of blood lactate level and subjective evaluation of physical exertion levels during the test. The lactate blood samples were taken twice at the end of the session, using the ACCUSPORT analyzer and REFLOTRON-4 accessories. Results were entered on a log sheet. TEEM and ECG (electrocardiograph) data were transferred to the RSE-Med laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]*

Anderson worked on the ESA MSG (Microgravity Science Glovebox) to prepare it for future experiment activities, today attempting for the third time to conduct a leak test on the WV (Work Volume) to verify the leak rate of the replaced seals. The attempt was again unsuccessful. Analysis and troubleshooting continue. However, the Glovebox can still be used for one level of containment. *[After the MSG and its A31p laptop were powered up, Clay used the fans to create a low pressure differential (10-17 mbar delta) between the WV and the ambient air for the subsequent 3-hr leak test, but the WV was again unable to hold the delta pressure. The last seal replacement, of the two 16-inch loading ports, was performed by Thomas Reiter on 8/29/06. Subsequent leak tests by Reiter, checking whether the MSG can maintain a specified level of containment in the sealed mode, were unsuccessful; the MSG did not hold a vacuum and almost immediately returned to ambient conditions. A leak check with an Ultrasound leak detector at that time found no leaks around the filters.]*

Continuing his work on the MSG computer, Clay transferred the complete set of data from the LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System) surface sampling sessions 2-5 from the laptop via cable to the LOCAD reader for subsequent downlink.

FE-1 Kotov transferred (from stowage) new hardware for the MATRYOSHKA-R radiation experiment and set it up at the location of the previous MATRYOSHKA elements in the DC1 (Docking Compartment), consisting of a new anthropomorphic (human torso) "Phantom" set with 16 passive dosimeters and an electronics box (LULIN-5). *[The complex Matryoshka payload suite is designed for sophisticated radiation studies. The payload collects radiation measurements every*

*few minutes of each hour around the clock. Note: Matryoshka is the name for the traditional Russian set of nested dolls, also called Babushka dolls when they are little old ladies (“grandmas”).]*

*Yurchikhin continued preparations for operating the Russian/German TEKh-20 Plasma Crystal-3 Plus (PK-3+) experiment payload. [After yesterday’s hardware setup, leak checking of the electronics box and evacuation of the vacuum work chamber (ZB) with the turbopump, the CDR conducted more testing and calibration, uploaded new software from a USB stick, checked out the software installation and verified the readiness of the experiment. After additional leak checking on the work chamber during the day, Fyodor will deactivate the turbopump tonight at ~5:25pm EDT. The experiment is performed on plasma, i.e., fine particles charged and excited by HF (high frequency) radio power inside the evacuated work chamber. Main objective is to obtain a homogeneous plasma dust cloud at various pressures and particle quantities with or without superimposition of an LF (low frequency) harmonic electrical field. The experiment is conducted in automated mode. PK-3+ has more advanced hardware and software than the previously used Russian PKE-Nefedov payload.]*

*Yurchikhin and Kotov, with ground support, continued the extensive troubleshooting of the TVM (Terminal) and TsVM (Central) computers of the RS (Russian Segment). [Fyodor and Oleg today focused on the cables in the SM associated with the TVM/TsVM operation, testing their shielding capability both for the “Start” and “Stop” circuits, and on the connectors in the associated multi-contact sockets for TVM1, TVM3, TsVM2 and TsVM3, using resistance (impedance) measurements to look for disconnected connectors. Yesterday’s resistance/continuity tests on the TVM2 data processing lane’s “start/stop” control circuitry had indicated all measurements to be nominal except those across the contacts of the “stop” relays which should have indicated completely open but showed partially closed contacts on at least two “stop” relays. This could be a possible explanation of the failure of the TVM2 startup attempt on 6/21. The search for the root cause is continuing.]*

*Anderson had another 1h 55m reserved for restowing EVA tools and equipment from the recent four 13A spacewalks.*

*Kotov had a 2-hr. job of inventorying/auditing medical support equipment (SMO) in the RS with IMS (Inventory Management System) logging, based on an uplinked listing. [Inventory included consumables, biomed harnesses, gastroenteric & urological medications, antiseptics, burn/trauma remedies, anti-inflammatory agents, Ecosphere kit contents, Fungistat kits, Reflotron-4 supplies, etc.]*

Clay conducted the weekly 10-min CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated “cue cards” based on the crew’s water callowns are sent up every other week. The current cue card, to be updated with today’s data, lists 27 water containers (~1022 liters total) for the four types of water identified on board: technical water (714.5 l, for Elektron, flushing, hygiene), potable water (265.1 l), condensate water, waste and other. The potable water transferred from the Shuttle is not to be used at present due to lack of sufficient biocide, until samples returned to Earth have been analyzed and cleared.]*

The FE-2 also completed the periodic CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout on the prime unit (#1060) and backup unit (#1057). *[Clay changed out the prime unit’s battery, then zero-calibrated both instruments. Following zero calibration, the backup unit was stowed, while the prime unit’s datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

The CDR had 1.5 hrs set aside to search FGB stowage for two “lost” electric units, a current converter (PTAB-1M ) and a current regulator (RT-50-1M). *[The PTAB is a component in the ZRU charge/discharge unit, along with a control unit (BUPT) and three charge/discharge current integrators (MIRT-3), of each of the Russian 800A storage batteries (8 in SM, 6 in FGB). The RT-50-1Ms (there are 12) receive and regulate the current from the solar arrays, one for each solar array module.]*

Working off the discretionary “time permitting” task list, the CDR performed the daily routine maintenance of the SOZh environmental control & life support systems (ECLSS) in the SM, including ASU toilet facilities systems/replaceables

Also from the voluntary job suggestions, Fyodor updated/edited the standard IMS “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Clay Anderson had another “free” hour set aside on his timeline for ISS familiarization & adaptation, to help in adjusting to his new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

The crew performed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR/MBI-8, FE-1/MBI-8, FE-2) and RED resistive exerciser (FE-2).

Later today, Clay will transfer the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The Elektron-VM O<sub>2</sub> (oxygen) generator remains off, and cabin air refreshes are being performed from Progress 24P O<sub>2</sub> stores (SrPK) as required. *[Due to the avionics maintenance activities this week the BITS2-12 onboard telemetry measurement system must be off, which in turn requires the Elektron to be deactivated. Turning Elektron on and off every time would impact its component service life.]*

*R6 Software Upgrade:* The IMMT (ISS Mission Management Team) today gave the Go for next week's major software transition on several USOS MDM (U.S. Segment Multiplexer/Demultiplexer) computers and PCS (Portable Computer System) laptops. *[The transition to the new, complex X2R6 version, after several years of development by many specialists, will take three days, beginning on 7/2 (Monday), with some post-uplink activities by the crew on 7/5. There will be several swaps of prime, backup and standby computers as each is loaded with the R6 software, involving the C&C (Command & Control), GNC (Guidance, Navigation & Control) and INT (Internal) MDMs plus four PCS laptops (version R10). The latter will then also carry a software patch for the new OGS (Oxygen Generation System), the final step before the latter's implementation. To avoid additional risk during these activities, Energia/Moscow has agreed not to experiment with the RS TVM & TsVM computers until after transition completion.]*

*BRI Failure Update:* Due to the recent failure of the Smart Switch Router (BRI) in the SM and its troubleshooting, Moscow has requested that the SSC (Station Support Computer)-1 laptop at the SM Central Post, currently linked directly to the SSC router in the USOS, be connected to Printer 1 in the SM to allow printing out uplinked radiograms. *[The Russian BRI router failed on 6/4, and there are no spares onboard. BRI is a part of the RS (Russian segment) OpsLAN network with connections to the three SSC (Station Support Computer) clients and the network printer in the SM. The BRI failure did not affect the Orlan EVAs and was not an impact on 13A. Also, the TORU manual teleoperator control's video system ("Klest" & "Simvol-Ts") is not compromised.]*

*MT Translation Delay:* The MT (Mobile Transporter) translation scheduled for tomorrow has been postponed due to failure (on 6/25) of an RPC (Remote Power Controller, #17) in an RPCM (RPC Module, S04B\_F), which provides power to one of two MT heater strings. After two attempts at re-closure, the RPC tripped open every time. Since no overcurrent was observed, which could have tripped the

switch, this is probably a hybrid FET (field-effect transistor) failure, a known issue. RPC 17 is currently open with the Close command inhibited so the MT is zero fault tolerant. MT translation is required prior to Flight 13A.1.

Today's CEO (Crew Earth Observation) photo targets were **African Dust** (*Dynamic Event: Looking left [west] of ISS track the crew should have been able to detect a dust storm exiting Africa. The were to look for edges of the dust cloud. The origin of these dust clouds are summer storms that kick up literally millions of tons of dust. Strong winds carry the dust over the Atlantic, affecting air quality in places like Puerto Rico and sometimes the eastern coast of the U.S. These large dust plumes deposit minerals in bodies of water and reflect the Sun's rays back into space*), **Bigach Impact, Kazakhstan** (*Bigach is another of the relatively young impact craters, dated at about 5 million years. It is 8 km in diameter but actually resembles an elongated feature rather than a circular structure. Using Lake Zaysan as a reference point, then looking to the N and W of the NW end of the lake*), and **U. S. East Coast Particulates** (*Dynamic Event: Looking along the eastern U.S. coast and towards the NE for a plume of particulates exiting from the U.S. and extending out over the Atlantic. The movement of the Bermuda high to the S has created wind patterns that will take the east coast particulates over the northern Atlantic. Trying to capture the edges of this plume*).

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:55am EDT [= epoch]*):

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Perigee height -- 329.3 km

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Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008187

Solar Beta Angle -- -17.8 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 80 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49255

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/13/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

07/13/07 -- ESA ships ATV "Jules Verne" to Kourou/French Guyana

07/16/07 -- Progress M-59/24P prop lines venting  
07/20/07 -- US EVA-9  
07/21/07 -- Progress M-59/24P undocking (DC1) & reentry  
07/22/07 -- Progress M-61/26P launch  
07/24/07 -- Progress M-61/26P docking (DC1 nadir)  
08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/09/07 -- STS-118/Endeavour/13A.1 docking  
08/19/07 -- STS-118/Endeavour/13A.1 undocking  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
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08/22/07 -- ISS reboost  
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*[under review]*  
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12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
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12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)

04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/27/07  
**Date:** Wednesday, June 27, 2007 1:22:35 PM  
**Attachments:**

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**ISS On-Orbit Status 06/27/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, the three station residents completed another session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis, then stowed the Urolux equipment. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

After breakfast, Yurchikhin, Kotov and Anderson also did the second part of the PHS/without blood labs assessment, the FE-2 first assisting the CDR and FE-1 as CMO (Crew Medical Officer), then being assisted by FE-1 for his own turn as subject. Afterwards, Clay completed data entry for all of them and stowed the PHS and MO-9 hardware. *[The U.S. PFE w/o Blood Lab is a monthly 1.5-hr. procedure which checks up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (cycle ergometer with vibration isolation) in the Lab. Readings are taken with the BP/ECG (blood pressure/electrocardiograph) and the HRM (heart rate monitor) watch with its radio transmitter. BP/ECG provides automated noninvasive systolic and diastolic blood pressure measurements while also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise.]*

Later, Anderson set up photo/video equipment for recording his subsequent fitness session, then prepared the PFE-OUM (Periodic Fitness Evaluation/Oxygen Uptake

Measurement) hardware at the HRF-2 (Human Research Facility 2) rack and conducted the session to obtain measurements on himself according to protocol, with Kotov assisting as operator. *[Afterwards, the evaluation protocol was updated, the gear deactivated and stored and the PFE-OUM laptop powered down. PFE-OUM is to demonstrate the capability of crewmembers to perform periodic fitness evaluations (PFE) with continuous oxygen consumption measurements within 14 days after arrival on ISS, and once monthly during routine PFEs. Once the capability of the PFS (Pulmonary Function System) to perform PFEs is verified, crewmembers will be able to integrate their monthly PFE with oxygen consumption measurements to fulfill the requirement for cardiovascular fitness evaluations during long-duration space flight. PFE-OUM is a collaborative effort between ESA and NASA. NASA Medical Operations require an evaluation of crew aerobic capacity. Currently, the crew aerobic capacity on-board is calculated using heart rate while the crew goes through a set exercise protocol. The PFS upgrade system developed for the HRF-2 provides the necessary hardware to directly measure oxygen consumption with the crewmember breathing through a mouthpiece in the performance of the routine PFE evaluation. The project is designed to be completed in three phases. Phase I, proof of concept, was demonstrated during Increment 13. Phase II, initial implementation for crewmembers and hardware check-out, is currently underway, and Phase III will be the migration to PFE-OUM for crew fitness evaluation.]*

CDR Yurchikhin and FE-1 Kotov performed a number of avionics maintenance jobs in the Service Module (SM), starting with troubleshooting a temperature sensor (TM168-04) inside the rigid air duct between FGB & SM, checking it with resistance measurements for possible replacement with a new spare, and making connections, with photo documentation. *[Restoring the integrity of the sensors' electrical circuitry required turning off the BITS2-12 onboard telemetry measurement system and VD-SU control mode. For testing the connections, the BITS was later turned on again.]*

Oleg and Fyodor then worked on the failed Smart Switch Router (BRI), testing its function by powering it up and monitoring indicator lights, while tagging up with ground specialists at TsUP/Moscow. The troubleshooting is an attempt at exploring recovery options. *[The Russian BRI router had failed on 6/4, and there are no spares onboard. BRI is a part of the RS (Russian segment) OpsLAN network with connections to the three SSC (Station Support Computer) clients and a network printer in the RS. Earlier, the crew had bypassed the failed unit by connecting SSC-1 directly to the SSC router in the USOS (US segment), making this laptop the only SSC available in the SM (SSC-2, SSC-3 and the SM printer remained unable to connect to the network, but the printer could be connected directly to the SSC-1 port). This did not affect the Orlan EVAs and was not an impact on 13A. Also, the TORU manual teleoperator control's video system ("Klest" & "Simvol-Ts") is not*

*compromised.]*

Kotov also continued the ongoing troubleshooting of the two inactive data processing subsets (lanes) of the RS TVM (Terminal) and TsVM (Central) computers, today using the “Elektronika MMTs-01” MultiMeter for a methodical continuity (resistance) check of the power channel and control channel circuits of the TVM2 unit.

The FE-1 retrieved a BRPK air/liquid condensate separator from stowage and flushed it with water, pumped from one EDV container through the unit to another EDV, to clean out any sediment deposits accumulated as a result of long-term storage. *[The BRPK, which may still be useful as a spare, had been removed from the SKV-2 air conditioning system on 5/17 and replaced with a new separator.]*

In the US Airlock, Clay Anderson terminated the 85-day maintenance discharge on the second set of EMU (Extravehicular Mobility Unit) batteries in the BSA (Battery Stowage Assembly) and stowed the unit. *[This procedure, required prior to their charging for the next spacewalk, consists of fully charging and then discharging the storage units to prolong their useful life. After end of the maintenance cycle, Clay was to restore the SSC 760XD laptop, used for the automated procedure in DOS mode, to nominal ops.]*

CDR Yurchikhin started preparations for another run of the Russian/German TEKh-20 Plasma Crystal-3 Plus (PK-3+) experiment payload by unstowing the hardware, installing it in the SM for operation and photographing the setup. The images were downlinked to TsUP via OCA for inspection, and the initial leak check of the electronics box performed. More work to come tomorrow. *[The experiment is performed on plasma, i.e., fine particles charged and excited by HF (high frequency) radio power inside an evacuated work chamber. Main objective is to obtain a homogeneous plasma dust cloud at various pressures and particle quantities with or without superimposition of an LF (low frequency) harmonic electrical field. The experiment is conducted in automated mode. PK-3+ has more advanced hardware and software than the previously used Russian PKE-Nefedov payload.]*

The two Russian crewmembers completed a 2h 30m session each of Part 1 of their second onboard “Profilaktika” (MBI-8, “Countermeasures”) preventive health maintenance fitness test series, starting with the VELO stationary cycle ergometer. *[Fyodor and Oleg will do an additional part of the test tomorrow (6/28) on the TVIS treadmill. Test procedure for MBI-8 is identical to the Russian MO-5 assessment, but in addition to the nominal procedure it uses the TEEM-100M gas analyzer with breathing mask, a blood lactate test with the ACCUSPORT analyzer and REFLOTRON-4 accessories, and a subjective evaluation of physical exertion levels*

*during the test (using the Borg Perceived Exertion Scale, viz., 10 steps from very light over hard and very hard to maximum). Results are entered on a log sheet. TEEM and ECG (electrocardiograph) data are transferred to the RSE-Med Laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]*

The FE-1 also unstowed and installed the equipment for the periodic Russian MO-10 "Hematokrit" testing that is scheduled tomorrow for all three crewmembers. *[MO-10 measures the hematocrit (red blood cell mass) value of the blood (it is a well-known phenomenon of space flight that red blood cell mass {normal range: 30-45%} tends to go down over time).]*

Yurchikhin reviewed descriptive material of a new orientation device for the URAGAN ("hurricane") earth observation program, a three-stage rate sensor (TIUS). Afterwards Fyodor tagged up with ground specialists via S-band to discuss the system, then set it up and experimented with it to familiarize himself, using the SKPF Photo Image Coordinate Reference System. *[TIUS is the main element of the SKPF system which allows the calculation of the coordinates of a photograph of the Earth's surface. The device, an optical gyroscope, measures angular rates and therefore its angular position in space. If activated on Earth, it shows the rotation of the Earth. Knowing the time of the photograph and therefore the orbital position of the ISS at that moment, and obtaining via TIUS (secured to the camera lens) the angular position at that same moment, the direction of the lens axis can be calculated and - with the known position of the camera - the coordinates of the center of the photo.]*

Anderson had an hour reserved for restowing EVA tools and equipment from the recent four 13A spacewalks, and another 45 minutes for unpacking cargo delivered on 13A.

Clay also conducted the periodic status checkup & filter inspection of the running CSI-4/5 (CGBA Science Insert 4/5) payload of seed germination modules and nematode worms housed in the CGBA (Commercial Generic Bioprocessing Apparatus) incubator. *[The incubator is controlled from the ground with automatic video downlinked to Earth. Students in the U.S. and Malaysia are participating in educational activities in their classrooms while monitoring the growth in orbit.]*

Oleg collected the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen*

*Cyanide (HCN).]*

The CDR performed the daily routine maintenance of the SOZh environmental control & life support systems (ECLSS) in the SM, including ASU toilet facilities systems/replaceables

Later, Fyodor also updated/edited the standard IMS “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Clay Anderson had another “free” hour set aside on his timeline for ISS familiarization & adaptation, to help in adjusting to his new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

The crew performed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2/OUM) and VELO bike with bungee cord load trainer (CDR/MBI-8, FE-1/MBI-8).

Later today, Oleg is to transfer the crewmembers’ exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The Elektron-VM O<sub>2</sub> (oxygen) generator remains off, and cabin air refreshes are being performed from Progress M-59/24P storage (SrPK) as required. *[There are several avionics maintenance activities scheduled this week in the RS which need the BITS2-12 onboard telemetry measurement system to be off, which in turn requires the Elektron to be deactivated. Turning Elektron on and off every time would impact its component service life.]*

Today’s CEO (Crew Earth Observation) photo targets were **Nile River Delta, Egypt** *(the Nile delta is another of observers’ long term monitoring sites. They are interested in documenting the state of the vegetation in the delta, and the margins between agriculture and urban use. The Nile delta is currently facing erosion on its outer edges and some coastal lagoons have had increasing salinity levels),* **Harvard Forest, Vermont** *(weather for this target site may have been marginal, however, because researchers have few images of the region they were asking for this imagery on this day. The Harvard Forest is located in a rural setting in north-central Massachusetts about 70 miles west of Boston. The 1200-hectare site lies in the Transition Hardwood-White Pine-Hemlock forest region, and includes a variety*

of forests and wetlands. Research at the Forest focuses on effects of natural and human disturbances on forest ecosystems. These disturbances include atmospheric pollution, global warming, hurricanes, treefalls, and insect outbreaks. Documenting land use and vegetation change), **Sevilleta Wildlife Area, New Mexico** (the main objective from the standpoint of CEO for all of these Long Term Ecological Research [LTER] sites is a record of land cover/land use change on a seasonal basis. The 400 mm views are used for documenting the boundaries between natural and urban areas. The Sevilleta LTER Project is located about 80 kilometers south of Albuquerque, New Mexico, in and around the Sevilleta National Wildlife Refuge [NWR]), **Yellowstone National Park, Wyoming** (researchers are documenting the health and extent of the vegetation in Yellowstone National Park. Context views of the park vegetation are requested), **Bozeman, Montana** (CEO is collaborating with the University of Montana, Regional Learning Project, Center for Continuing Education to take images of major transportation routes. These routes address the issue of how the U.S. met the growing needs of an expanding population from the time of its inception until the frontier shifted from the American West to space. Images of Bozeman from the ISS will be used as tools to facilitate discussion and enhance the learning process. Context views of the city and surrounding area are desirable), and **Johnston Island reef, Central Pacific** (Johnston Atoll is approximately 1400 km southwest of Hawaii. There are four islands on the reef platform, and Johnston is the largest of the islands. While the reef does not encircle the island, the reef that does exist is visible on the NW side of the island. CEO is documenting the condition of the reefs in the Pacific).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:10am EDT [= epoch]):

Mean altitude -- 334.9 km

Apogee height -- 340.3 km

Perigee height -- 329.5 km

Period -- 91.23 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008028

Solar Beta Angle -- -14.6 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 80 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49240

**Significant Events Ahead** (*all dates Eastern and subject to change*):

- 07/13/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)
- 07/13/07 -- ESA ships ATV "Jules Verne" to Kourou/French Guyana
- 07/16/07 -- Progress M-59/24P prop lines venting
- 07/20/07 -- US EVA-9
- 07/21/07 -- Progress M-59/24P undocking (DC1) & reentry
- 07/22/07 -- Progress M-61/26P launch
- 07/24/07 -- Progress M-61/26P docking (DC1)
- 08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3
- 08/09/07 -- STS-118/Endeavour/13A.1 docking
- 08/19/07 -- STS-118/Endeavour/13A.1 undocking
- 08/21/07 -- STS-118/Endeavour/13A.1 landing
- 08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*
- 08/22/07 -- ISS reboost
- 09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)
- 10/01/07 -- Progress M-61/26P undocking (DC1) & reentry
- 10/02/07 -- Soyuz TMA-11/15S launch
- 10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)
- 10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing
- 10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*
- 10/20/07 -- (NET) STS-120/Discovery/10A docking
- 10/22/07 -- (NET) Node 2 relocation
- 10/29/07 -- (NET) STS-120/Discovery/10A undocking
- 11/06/07 -- US EVA-10
- 11/14/07 -- US EVA-11
- 11/20/07 -- US EVA-12
- 12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite
- 12/08/07 -- (NET) STS-122/Atlantis/1E docking
- 12/12/07 -- Progress M-62/27P launch *[to be reviewed]*
- 12/13/07 -- (NET) STS-122 undocking
- 12/14/07 -- Progress M-62/27P docking
- ??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)
- ??/??/08 -- ATV-1 docking (SM aft port)
- 02/??/08 -- Russian EVA-20 *[to be reviewed]*
- 02/12/08 -- Progress M-63/28P launch *[to be reviewed]*
- 02/14/08 -- Progress M-63/28P docking
- 02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS
- 02/16/08 -- (NET) STS-123/Endeavour/1J/A docking
- 02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking
- 04/04/08 -- ATV-1 undocking (from SM aft port)
- 04/07/08 -- Progress M-63/28P undocking

04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 06/26/07

**Date:** Tuesday, June 26, 2007 12:36:12 PM

**Attachments:**

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**ISS On-Orbit Status 06/26/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, FE-2 Anderson completed the second session of his first run with the NASA/JSC experiment NUTRITION. During today's part, he collected another urine sample and stored it in the MELFI (Minus-Eighty Laboratory Freezer for ISS). The sampling kit was then stowed away. *[The current NUTRITION project expands the previous Clinical Nutritional Assessment profile (MR016L) testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R +30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

To prepare for more water transfer from the Progress 24P cargo ship to the Service Module (SM) "Rodnik" tanks, scheduled tomorrow, FE-1 Kotov performed the standard tank bladder leak check by compressing the SM BV2 tank's bladder. Ground specialists stood by for tagup support, if required. *[The pressurization of the collapsed bladder of the Rodnik water storage tank is conducted in three separate operational steps as a leak check. Each of the two spherical Rodnik tanks consists of a hard shell with a bladder, a soft membrane composed of elastic fluoroplastic, which is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane.]*

CDR Yurchikhin worked on the GTS (Global Transmission Services) hardware in the SM, removing and replacing its old GTS-1 electronics box with a new GTS-2 unit delivered on Progress 24P. *[GTS-2 is a German-developed, ESA-sponsored technology experiment for testing, validating & demonstrating of radio transmission techniques for the synchronization of earth-based clocks and watches from ISS. In addition, GTS data services, based on a unique coding scheme, could ultimately*

*lead to commercial services directly from space (such as blocking of stolen cars or lost credit cards). The experiment investigates the possibilities of transmitting a time signal from the ISS to synchronize ground clocks via an external antenna with a broad antenna pattern. Since the station's orbit allows this signal to cover almost the whole globe every day, it can be received at any location several times daily, for 5-12 min at a time, strong enough for even small wrist watches. GTS also broadcasts the station's current orbital position, so clocks know their local time zone. GTS-2, a continuation of the earlier GTS-1 ISS experiment (which transmitted weaker-than-expected signal strength to GTS receivers), will verify the performance & accuracy of a time signal broadcast to Earth from low orbit under real space operational conditions. It will also measure the signal quality and data rates on the ground and measure disturbing effects such as Doppler shifts, multi-path reflections, shadowing and elevation effects.]*

Yurchikhin switched the Vozdukh CO<sub>2</sub> removal system to Mode 1 (automatic cycle control), letting it run for several hours until Kotov later switched it to Mode 5 (manual control).

Working for half an hour in the Soyuz TMA-10/14S crew return vehicle, Oleg changed the ASU toilet fitting from "female" back to "male" configuration.

The CDR conducted maintenance on the SM communications system by swapping comm panel amplifiers between panels PA-2 & PA-3 and conducting a test on the degraded ("ratty") PA-2, supported by ground specialist tagup.

The FE-1 meanwhile worked on two stowage bags with IMV (Intermodular Ventilation) equipment, auditing and consolidating the gear, including air ducts and SVS (Space Vision Sight, VSK) blower fans.

Yurchikhin performed a major one-hour job of upgrading/burning firmware software (vers. 01.06) for the first- & second-string navigation computers (NVM1,2) of the ASN-M (Satellite Navigation System) in the SM from Laptop 3 and a floppy diskette. *[The ASN-M satellite navigation system will be required for the arrival of the European ATV (Automated Transfer Vehicle) "Jules Verne" next year.]*

FE-2 Anderson completed the periodic thorough inspection of the ELPS (Emergency Lighting Power Supply) units in the U.S. segment (USOS). *[There are three ELPS units in the Node, two in the Lab, and one ELPS in the US Airlock (A/L).]*

In the A/L, Anderson terminated the 85-day maintenance discharge on the first set of EMU (Extravehicular Mobility Unit) batteries in the BSA (Battery Stowage Assembly) and then started it on the second set. The first unit was stowed. *[This*

*procedure, required prior to their charging for the next spacewalk, consists of fully charging and then discharging the storage units to prolong their useful life. After end of the maintenance cycle, Clay will restore the SSC 760XD laptop, used for the automated procedure in DOS mode, to nominal ops.]*

At the Cupola RWS (Robotics Work Station) in the Lab, the FE-2 disconnected the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable used for video coverage during the recent MSS (Mobile Service System) operations.

Oleg Kotov had two hours set aside to conduct the annual inspection and photo-documentation of window panes in the SM. The observed defects were recorded in image and text files on the RSK1 laptop for subsequent downlink via U.S. OCA assets. *[Objective of the inspection, using digital still camera (Nikon D1X w/SB-28DX flash) and voice recorder, was to assess the pane surfaces on SM windows 6, 7, 8, 12, 13 for any changes (new cavities, scratches, new or expanded old stains or discolorations affecting transparency properties) since the last inspection, performed by Mikhail Tyurin on 10/20/06. The new assessment will be compared to the earlier observations. Defects are measured with the parallax method which uses eyeball-sighting with a ruler and a right isosceles triangle to determine the defects' size and position with respect to the window's internal surface (parallax being the apparent change in an object's position resulting from changing the observer's position).]*

Fyodor Yurchikhin completed the periodic checkup/servicing of the ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) AST spectrometer data by removing its PCMCIA memory card (#925) for subsequent data downlink during a suitable comm opportunity, and replacing it with a new card (#930). *[The new PCMCIA was inserted in the AST. The ALTCRISS spectrometer/dosimeter provides long-term records of space radiation in the SM.]*

The CDR performed the daily routine maintenance of the SOZh environmental control & life support systems (ECLSS) in the SM, including ASU toilet facilities systems/replaceables

Later, Fyodor also updated/edited the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

FE-1 Kotov unstowed the AMP (Ambulatory Medical Pack) and ABPC (Automatic Blood Pressure Cuff) and set up the hardware for the general HMS PHS (Health Maintenance Systems/Periodic Fitness Evaluation) without blood lab. Oleg also readied the equipment for the Russian "Urolux" biochemical urine testing (PZE MO-9), both scheduled for tomorrow. *[MO-9 is conducted regularly every 30 days (and*

*also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for US crewmembers for IMG (Integrated Medical Group) PHS evaluation as part of the "PFE w/o Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. The data are then entered in the Medical Equipment Computer (MEC)'s special IFEP (In-Flight Examination Program) software. The US PFE w/o Blood Lab is a monthly 1.5-hr. procedure which checks up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (cycle ergometer with vibration isolation) in the Lab. Readings are taken with the BP/ECG (blood pressure/electrocardiograph) and the HRM (heart rate monitor) watch with its radio transmitter. BP/ECG provides automated noninvasive systolic and diastolic blood pressure measurements while also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise.]*

FE-2 Anderson meanwhile worked on the HRF-2 (Human Research Facility 2) rack to break out and set up some of the equipment for the PFE-OUM (Periodic Fitness Evaluation with Oxygen Uptake Measurement) assessment, scheduled for him tomorrow with Oleg assisting as operator. *[PFE-OUM is to demonstrate the capability of crewmembers to perform periodic fitness evaluations (PFE) with continuous oxygen consumption measurements within 14 days after arrival on ISS, and once monthly during routine PFEs. Once the capability of the PFS (Pulmonary Function System) to perform PFEs is verified, crewmembers will be able to integrate their monthly PFE with oxygen consumption measurements to fulfill the requirement for cardiovascular fitness evaluations during long-duration space flight. PFE-OUM is a collaborative effort between ESA and NASA. NASA Medical Operations require an evaluation of crew aerobic capacity. Currently, the crew aerobic capacity on-board is calculated using heart rate while the crew goes through a set exercise protocol. The PFS upgrade hardware developed for the HRF-2 provides the necessary hardware to directly measure oxygen consumption with the crewmember breathing through a mouthpiece in the performance of the routine PFE evaluation. The project is designed to be completed in three phases. Phase I, proof of concept, was demonstrated during Increment 13. Phase II, initial implementation for crewmembers and hardware check-out, is starting presently, and Phase III will be the migration to PFE-OUM for crew fitness evaluation.]*

Anderson conducted the periodic (every two weeks) inspection of the RED (Resistive Exercise Device) with canister cords and accessory straps as well as the canister bolts for re-tightening if required.

The crew performed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (CDR, FE-1), and RED resistive exerciser (FE-1, FE-2).

Later today, Oleg is to transfer the crewmembers' exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:25am EDT, Yurchikhin and Kotov downlinked two PAO TV messages of congratulations and best wishes to TsUP-Moscow: (1) to the newly appointed Chairman of Customs Control of the Kazakhstan Ministry of Finance, Kozy-Korpesh Zhaparkhanovich, and (2) to the staff and veterans of the Russian Red Cross on the occasion of the 140<sup>th</sup> anniversary of this organization.

At ~11:20am, the crew downlinked PAO TV messages via S/G-2 & Ku-band for deferred release at NASA Visitors Centers around the US, the NASA website "tease", and the 67<sup>th</sup>-annual "Pikes Peak or Bust Rodeo" event on July 11-15, sponsored by Schriever AFB, Colorado Springs, Colorado.

Clay had another "free" hour set aside on his timeline for ISS familiarization & adaptation, to help in adjusting to his new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

At 3:10pm, Anderson is scheduled for the periodic VHF1 emergency communications check over NASA's VHF (Very High Frequency) sites at Dryden (3:17pm), White Sands (3:19pm) and Wallops Island (3:27pm), talking with Houston/Capcom, MSFC/PAYCOM (Payload Operation & Integration Center Communicator) and Moscow/GLAVNI (TsUP Capcom) in the normal fashion via VHF radio from a handheld microphone and any of the U.S. segment ATUs (audio terminal units). *[Purpose of the test is to verify signal reception and link integrity, and to ensure minimum required link margin during emergency (no TDRS) and special events (such as a Soyuz relocation). Last time done: 5/23/07.]*

As a voluntary job item from the Russian "time permitting" task list, Fyodor was to continue the extensive, time-consuming audit/inventory of CDs (Compact Disks) onboard the ISS, many to be excessed, using an uplinked listing of ~61 CDs for referral and disposition.

A new item added to Clay's discretionary "job jar" task list is the relocation of the SSC-10 (Station Support Computer 10) A31p laptop from the A/L to the Node where it was previously located for the ROBoT (Robotics Onboard Trainer) sim activities, and the preparation of the A31p for future ROBoT ops. *[ROBoT uses DOUG (Dynamic Operations Ubiquitous Graphics) software, a hand controller and two laptops (one for graphics, one for the simulation) for on-orbit training of MSS*

*and SSRMS (Space Station Remote Manipulator System) operations.]*

*Conjunction Update:* Late last night, probability of collision (Pc) with Object 29719, a piece of debris from a Chinese satellite (Fengyun 1C) went to zero as three consecutive conjunction predictions conducted by US and Russian Ballistics experts met all criteria for standing down from DAM (Debris Avoidance Maneuver).

*Solar Array Drag Reduction Delay:* Implementation of the planned drag-reduction mode of off-pointing the US SAWs (Solar Array Wings), delayed until after the conjunction, is now scheduled to begin today at 5:50pm EDT.

*Saturday Science Preview:* For the next voluntary "Saturday Science" demo program on 6/30, Clay Anderson has chosen HRF-CCISS (Human Research Facility/Cardiovascular & Cerebrovascular Control on Return from ISS). *[CCISS will study the effects of long-duration spaceflight on crewmembers' heart functions and their blood vessels that supply the brain. Learning more about the cardiovascular & cerebrovascular systems could lead to specific countermeasures that might better protect future space travelers.]*

Today's CEO (Crew Earth Observation) photo targets were **Lake Nasser, Toshka Lakes, Egypt** (*the Lake Nasser, Toshka Lakes region has been documented since 1997. Observers have witnessed through astronaut imagery the filling of the lakes. Lately they have noticed further modification, namely the lowering of lake levels. The crew has been asked to continue to document lake levels. The Toshka Lakes are located to the west of Lake Nasser*), **Ouarkziz Impact Crater, Algeria** (*Ouarkziz is a relatively "young" impact crater, dated at 70 million years. The crater is 3.5 km in diameter and is located in folded rocks in Algeria*), and **Florida Coastal Everglades** (*research focuses on understanding ecosystem processes along the two major drainage basins in Everglades National Park: Shark River Slough and Taylor Slough. Scientists are particularly interested in the dynamics in the area where freshwater and wetlands meet. This dynamic in the landscape is in response to changing freshwater inflow [with Everglades restoration], sea level rise [climate change responses], and disturbance [particularly hurricanes and fire]. Currently Florida is in the middle of one of the worst water shortages in its history. Recent rainfall has only made a dent in the multi-year shortfall affecting the state*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

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**ISS Orbit** (as of this morning, 10:58am EDT [= epoch]):

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Perigee height -- 329.6 km

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Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007937

Solar Beta Angle -- -11.1 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 83 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49226

**Significant Events Ahead** (all dates Eastern and subject to change):

07/13/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

07/13/07 -- ESA ships ATV "Jules Verne" to Kourou/French Guyana

07/16/07 -- Progress M-59/24P prop lines venting

07/20/07 -- US EVA-9

07/21/07 -- Progress M-59/24P undocking (DC1) & reentry

07/22/07 -- Progress M-61/26P launch

07/24/07 -- Progress M-61/26P docking (DC1)

08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/09/07 -- STS-118/Endeavour/13A.1 docking

08/19/07 -- STS-118/Endeavour/13A.1 undocking

08/21/07 -- STS-118/Endeavour/13A.1 landing

08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*

08/22/07 -- ISS reboost

09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1) & reentry

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)

10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing

10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*

10/20/07 -- (NET) STS-120/Discovery/10A docking

10/22/07 -- (NET) Node 2 relocation

10/29/07 -- (NET) STS-120/Discovery/10A undocking

11/06/07 -- US EVA-10

11/14/07 -- US EVA-11

11/20/07 -- US EVA-12

12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- (NET) STS-122/Atlantis/1E docking

12/12/07 -- Progress M-62/27P launch *[to be reviewed]*

12/13/07 -- (NET) STS-122 undocking

12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/25/07  
**Date:** Monday, June 25, 2007 1:27:09 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 06/25/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 10 of Increment 15.*

Before breakfast, FE-2 Anderson began the first day of his first session with the NASA/JSC experiment NUTRITION, for which he had to forego exercising and food intake for eight hours. *[Clay started the session with phlebotomy, i.e., collecting blood samples (from an arm vein) which were first spun in the HRF RC (Human Research Facility/Refrigerated Centrifuge) and then placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. Anderson also started the required 24-hour data collection by securing urine specimen during the day, also stored immediately in MELFI. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

FE-1 Kotov worked on the Elektron-VM O<sub>2</sub> (oxygen) generator, deactivating it from laptop after the usual nitrogen (N<sub>2</sub>) purge of the BZh-9 Liquid Unit at 0.65 kg/cm<sup>2</sup> via its KE3 and VN3 valves. *[A number of maintenance activities this week need the BITS2-12 onboard telemetry measurement system to be off, which in turn requires the Elektron to be deactivated. Turning Elektron on and off every time would impact its component service life.]*

CDR Yurchikhin completed an O<sub>2</sub> atmosphere refresh from Progress M-59/24P storage (SrPK).

Afterwards, Yurchikhin performed major maintenance on the Regul-OS radio subsystem, removing the second-string transmitter unit (SA325) and replacing it with a new spare. Later, the R&R was tested by the ground after Yurchikhin had reconnected the BITS2-12 (which had to be off for the R&R). *[Located in the Service Module (SM), the Regul-OS is a subsystem of the RSUS Radio Control & Comm System of the Russian segment (RS) for handling two-way voice communication, digital command/program information, and telemetry transmission via Russian groundsites (RGS). Regul is the nominal uplink channel for all Russian commands; operating at a low data rate, it is equivalent to the US S-band system. The SA325 block replaced today is one of three redundant units, each containing a transceiver (PPA) and Digital Processor (UtsO).]*

FE-1 Kotov conducted the periodic sampling of cabin air for subsequent analysis on the ground, first employing the IPD-CO Draeger tubes sampler to check for CO (Carbon Monoxide) in the SM, then using the Russian AK-1M adsorber to sample the air in the SM and FGB.

Oleg Kotov and Clay Anderson worked together in a handover familiarization & checkout session with the US CMRS (Crew Medical Restraint System), followed by a checkout of the RSP (Respiratory Support Pack).

Later, Kotov and Anderson performed the mandatory CHeCS (Crew Health Care Systems) emergency/contingency medical OBT (on-board training) drill, a one-hour U.S. exercise designed to refresh crewmembers' acuity in applying HMS (Health Maintenance System) equipment like ACLS (Advanced Cardio Life Support) in an emergency. *[The drill gives crewmembers the opportunity to work as a team in resolving a simulated medical emergency onboard ISS and to refresh their memory of on-orbit stowage and deployment locations, equipment use, and procedures. Setting up (but not actually operating/manipulating) onboard equipment such as the RSP (Respiratory Support Pack), ALSP (Advanced Life Support Pack), intubation*

*kit, HMS defibrillator, all stowed in the Lab CHeCS rack, and the CMRS (Crew Medical Restraint System), Oleg and Clay stepped through the ACLS algorithm manual to resolve a simulated medical emergency onboard ISS. Objectives of the exercise include practicing communication and coordination necessary to perform medical emergency procedures, locating appropriate emergency medical components, and determining each crewmember's individual method of delivering CPR (cardio-pulmonary resuscitation) in zero-G.]*

In the US Airlock, Anderson started the 85-day maintenance cycle on the first of two sets of EMU (Extravehicular Mobility Unit) batteries. *[This procedure, required prior to their charging for the next spacewalk, consists of fully charging and then discharging the storage units to prolong their useful life. After end of the maintenance cycle, Clay will restore the SSC 760XD laptop, used for the automated procedure in DOS mode, to nominal ops.]*

The CDR began the continuing task of gathering and preparing excessed items for disposal in Progress 24P as trash, keeping a running log of the changes for the IMS (Inventory Management System) database.

Clay later updated/edited the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Oleg performed the daily routine maintenance of the SOZh environmental control & life support systems (ECLSS) in the SM, including ASU toilet facilities systems/replaceables

The crew completed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-1, FE-2), and VELO bike with bungee cord load trainer (CDR).

Later today, Clay transfers the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

As a voluntary job item from the Russian "time permitting" task list, Fyodor started an extensive, time-consuming audit/inventory of CDs (Compact Disks) onboard the ISS, many to be excessed, using an uplinked listing of ~61 CDs for referral and disposition.

*Conjunction Update:* US and Russian ballistics experts are monitoring a

conjunction with debris (Object 29719) from a Chinese satellite (Fengyun 1C), with TCA (Time of Closest Approach) tomorrow at 4:26pm EDT. *[Currently predicted miss distance: 17 km. Further updates will determine the need for a DAM (Debris Avoidance Maneuver), with Go/No-Go decision today at 4:56pm EDT. Time of ignition (TIG), if necessary: tomorrow afternoon at 2:10pm.]*

*Solar Array Drag Reduction Delay:* Implementation of the planned drag-reduction mode of off-pointing the US SAWs (Solar Array Wings) has been delayed until after the conjunction TCA to avoid adding to the prediction variables for the DAM analyses.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 11:57am EDT [= epoch]):*

Mean altitude -- 335.0 km

Apogee height -- 340.2 km

Perigee height -- 329.9 km

Period -- 91.23 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007657

Solar Beta Angle -- -7.4 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 110 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49211

**Significant Events Ahead** *(all dates Eastern and subject to change):*

07/13/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install) **[new date]**

07/13/07 -- ESA ships ATV "Jules Verne" to Kourou/French Guyana

07/16/07 -- Progress M-59/24P prop lines venting

07/20/07 -- US EVA-9

07/21/07 -- Progress M-59/24P undocking (DC1) & reentry **[new date]**

07/22/07 -- Progress M-61/26P launch

07/24/07 -- Progress M-61/26P docking (DC1)

08/07/07 -- STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/09/07 -- STS-118/Endeavour/13A.1 docking

08/19/07 -- STS-118/Endeavour/13A.1 undocking  
08/21/07 -- STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
08/22/07 -- ISS reboost  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
??/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
??/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/24/07  
**Date:** Sunday, June 24, 2007 12:58:21 PM  
**Attachments:**

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**ISS On-Orbit Status 06/24/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Clay Anderson). Ahead: Week 10 of Increment 15.*

The FE-1 performed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM) and the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Kotov also gathered data on total operating time & ON durations of the Russian POTOК-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

Anderson unstowed and set up the hardware for the urine collection part of his first session with the NUTRITION experiment, beginning tomorrow with a blood draw, requiring Clay to forego exercising and food intake for eight hours, i.e., starting tonight. *[The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts, collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing in-flight samples (plus an additional postflight sample), made possible by the MELFI/Minus Eighty Degree Celsius Laboratory Freezer for ISS.]*

Working off the Russian voluntary task list, Fyodor Yurchikhin conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature. *[Today's Uragan photo targets were the Pamir mountain range with detailed views of RGO and Medvezhy Glaciers stretching to the west of Fedchenko Glacier, Tien-Shan with the two largest southern and northern converging glaciers,*

*the south of Lake Baikal, detailed views of river valleys flowing from Khaman-Daban Range to the south towards the lake, Siberian river valleys, right tributaries of Amur river, Sakhalin Island, the Caspian Sea, Lake Aral Sea with dust storms, if any, the Altai mountains, detailed views of the Katun valley in nadir and of Lake Telets, Greece, the town of Aleksandrovka, the Volga delta, Kaluga and the Ugra valley.]*

A discretionary task list item for Oleg Kotov was another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Japanese HDV video camera to obtain imagery of the bio-luminescent glow of high production zones from SM window #7. *[Photo targets were the Indonesian Archipelago, the northern coastal area of Australia, and the seashore of southern Australia and New Zealand.]*

The crew performed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

At ~3:30pm EDT, Clay is scheduled for his weekly PFCs (Private Family Conferences) via S-band/audio and Ku-At band/MS-NetMeeting application (which displays the uplinked ground video on a laptop). *[Per ISS crew request, PFCs were kept to a minimum during the docked period due to comm time constraints, with family concurrence.]*

The crew's EPO (Educational Payload Operation) program yesterday, demonstrating advantages and difficulties of "Sports in Micro-G", drew rave reviews from the ground: *"We enjoyed the wide world of sports! Or should we say, out of this world. **Not many people can say they hit a 17,500 mph fastball!**"*

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
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Mean altitude loss in the last 48 hours -- 100 m  
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07/13/07 -- ESA ships ATV "Jules Verne" to Kourou/French Guyana  
07/19/07 -- Progress M-59/24P undocking (DC1) & reentry  
07/20/07 -- US EVA-9  
07/20/07 -- Progress M-61/26P launch  
07/22/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
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10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
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10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks *[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
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12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
01/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*

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02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
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04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/23/07  
**Date:** Saturday, June 23, 2007 1:15:59 PM  
**Attachments:**

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**ISS On-Orbit Status 06/23/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 15 crew CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Clay Anderson, except for regular maintenance & voluntary work.*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, Fyodor and Oleg also performed preventive maintenance cleaning on SM fans & grilles VPkhO, VDPkK, VPrK and FS9, and on the V3 ventilator grill in the DC1 (Docking Compartment).

Anderson disconnected the QD (Quick Disconnect) jumper of the TCS LTL (Thermal Control System Low Temperature Loop) to the LAB1D6 rack, now no longer required after last night's deactivation of the US CDRA (Carbon Dioxide Removal Assembly) by the ground.

The FE-2 also powered down the PCS (Portable Computer System) A31p laptop of the CUP RWS (Cupola Robotic Work Station). *[Clay received kudos for his great work with the SSRMS (Space Station Remote Manipulator System) operations yesterday. Ground control procedures to survey/inspect the Node nadir CBM (Common Berthing Mechanism) are scheduled for tomorrow and Monday, with the Cup RWS active and video routed. The CBM seal inspection is in preparation for*

*the PMA-3 relocation from the Node portside dock on 7/13.]*

At ~9:20am EDT, the crew conducted their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

The CDR completed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

After Clay Anderson configured the camcorder setup for today's EPO (Educational Payload Operation) program, he performed the scheduled "Sports in Micro-G" activities with which he demonstrated the advantages, disadvantages, and adaptation required for playing sports in micro-G. *[As all EPO videos, the DVD will be used by the Educational Community for school classes.]*

At ~6:55am, Yurchikhin and Kotov downlinked a PAO/TV message of greetings and congratulation to the 2007 Graduating Class of students at renown Bauman Moscow State Technical University. *[...We appreciate Bauman University for first-rate training of specialists. We would like to wish the new corps of Bauman engineers all those things that we wish cosmonauts before launch: good health for many years, prosperity, successful and productive carrier for the benefit of our great and proud Russia. Always remember your Alma Mater! We found out that this very moment the 13<sup>th</sup> Athletic University Student Team starts a non-stop relay from the ancient Slobodsky Palace to the Plesetsk space launch complex. This relay is dedicated to all the big anniversaries associated with space exploration. Greetings and congratulations to all participants of this historically significant relay! We would also like to ask you to include us as a part of your team and you can always count on our support. We wish you successfully reach the finish line at the main space launch facility of Russia. Long live Bauman Moscow State Technical University! Bauman alumni, hip-hip hurrah!"]*

Working off the Russian voluntary task list, Fyodor Yurchikhin conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature. *[Today's Uragan photo targets were the Altai mountains and the Katun biospheric park, detailed views of the Irkut river valley running right on track on approach to Baikal, detailed views of the Khamar-Daban range valley sloping to Baikal from the south Alps, of glaciers on the left (southern) side of the Rhone river valley and the river falls into Lake of Geneva, the glaciers stretch to the east of Lake of Geneva and near the lake, water reservoirs near the glaciers behind arched*

*dams, detailed views of the Ugra river valley falling into Oka river on Oka stretch from south to north before Kaluga, and a series of shots upward of Ugra river.]*

A discretionary task list item for Oleg Kotov was the periodic check of the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the MATRYOSHKA-R payload in the DC1 Docking Compartment. *[The reader automatically records radiation readings at strictly defined times (:00, :15, :30, :45 minutes). The complex Matryoshka payload suite is designed for sophisticated radiation studies. The payload collects radiation measurements every 15 minutes of each hour around the clock.]*

As a second task list item, Oleg used the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

Also working off the "time permitting" job list, the two cosmonauts were to perform cargo transfers from the Progress M-60/25P vehicle, keeping a running database update in the IMS (Inventory Management System).

A new entry on the "job jar" task list for all crewmembers is "ghosting" an updated personal image with their preferred material on an A31p laptop 60GB hard disk reserved as their CPSD (Crew Personal Support Disk).

The crew performed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

Afterwards, Clay transferred the exercise data files to the MEC (Medical Equipment Computer), as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*Correction:* The Atlantis mission STS-117/13A that ended yesterday at Edwards AFB was not the 116<sup>th</sup> Space Shuttle flight, as reported here, but the 118<sup>th</sup>. It was also the 21<sup>st</sup> Shuttle flight to the ISS, the 28<sup>th</sup> for Atlantis and the first of four Shuttle missions planned for 2007. *[For an ISS Assembly overview, see <http://www.hq.nasa.gov/osf/station/assembly/ISSProgress.html> .]*

**Weekly Science Update** (*Expedition Fifteen -- 9<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* No activities. ALTEINO is performing nominally according to the latest information.

*ANITA:* Planned.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2:* Planned.

*CFE (Capillary Flow Experiment):* Reserve.

*CHROMOSOME-2 (E14 SFP):* Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* In support for BCAT-3 only.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Complete.

*EMCH (Elastic Memory Composite Hinge):* Complete.

*EPO (Educational Payload Operation) Kit C:* Planned.

*IMMUNO (Saliva Sampling):* Planned.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* Planned

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* Planned.

*NEOCYTOLYSIS (E14 SFP):* Completed.

NOA-2 (*Nitric Oxide Analyzer*): Planned.

NUTRITION: Complete.

SAMPLE: Ongoing.

SAMS/MAMS (*Space & Microgravity Acceleration Measurement Systems*): Ongoing.

SLEEP (*Sleep-Wake Actigraphy & Light Exposure during Spaceflight*): “Clay: Thanks for downloading Suni’s Actiwatch and downloading/initializing your Actiwatch. Your remaining activities are monthly downloads, three weeks of sleep logging, and an Actiwatch doff. The video was great and positioning the camera to see the screen of the PC really helped us follow along so we could head off any potential problems.”

SPHERES (*Synchronized Position Hold, Engage, Reorient, Experimental Satellite*): Planned.

Swab (*Characterization of Microorganisms & Allergens in Spacecraft*): In progress.

TRAC (*Test of Reaction & Adaptation Capabilities*): Planned.

CEO (*Crew Earth Observations*): Through 6/17 the ground has received a total of 4,095 CEO images for review and cataloging for Increment 15. “We have noted that you have continued CEO photography including additional encounters with Iceberg A22A. A pair of your photos of this huge berg will be posted in an article on NASA/GSFC’s Earth Observatory website this weekend. Thanks for your continued support!”

Today’s CEO (Crew Earth Observation) photo targets were **Eastern Tien Shan, China** (*glaciers on the crests of the Tien Shan ranges are being monitored by global change scientists as examples of lower latitude glaciers*), **Tigris-Euphrates Delta, Persian Gulf** (*swift changes are occurring in the coastal configuration of this major world delta due to extensive devegetation of vast swamplands just upstream by the former Iraqi regime. Detailed images of the coastline looking left of track are requested*), and **Bigach Impact Crater, East Kazakhstan** (*looking left of track before ISS reached the Lake Zaysan area for this 8 km-diameter crater. It is relatively well marked visually because agricultural fields have been established within its rim*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are

downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 11:32am EDT [= epoch]*):

Mean altitude -- 335.3 km  
Apogee height -- 340.5 km  
Perigee height -- 330.1 km  
Period -- 91.24 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0007739  
Solar Beta Angle -- 0.7 deg (bottoming out)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in the last 48 hours -- 80 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49179

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/13/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
07/13/07 -- ESA ships ATV "Jules Verne" to Kourou/French Guyana  
07/19/07 -- Progress M-59/24P undocking (DC1) & reentry  
07/20/07 -- US EVA-9  
07/20/07 -- Progress M-61/26P launch  
07/22/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12

12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
01/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/22/07  
**Date:** Friday, June 22, 2007 3:58:46 PM  
**Attachments:**

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**ISS On-Orbit Status 06/22/07**

All ISS systems continue to function nominally, except those noted previously or below.

After an additional day in space and with KSC weather remaining adverse, **STS-117/ Atlantis returned to Earth today**, touching down at Edwards AFB in the Mojave Desert on the first Californian opportunity at 3:50pm EDT after 219 orbits and a perfect ISS 13A mission, mirroring STS-115/12A last September in delivering the massive S3/S4 truss segments. It was the 116<sup>th</sup> flight of a Space Shuttle.

*Welcome back, Atlantis, after a 13 d 20 hrs 12 min and ~5.8 million-mile journey in space! And welcome back, Suni Williams, with your new spaceflight endurance record for women worldwide of 194 d 19 hrs 3 min, not to speak of your all-time women's spacewalk record of an accumulated 29 hrs 17min.*

After setting up the MSS DOUG (Mobile Service System/Dynamic Operations Ubiquitous Graphics) application yesterday, FE-2 Anderson today connected the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable at the Cupola RWS (Robotics Work Station) and closed the Lab science window shutter before supporting the ground in today's operations of the Canadian SSRMS (Space Station Remote Manipulator System). *[The robotarm was first walked off the MBS/MT (Mobile Base System/Mobile Transporter), by first releasing PDGF-2 (Power & Data Grapple Fixture 2) on the MBS and grappling the Lab PDGF, followed by the base change resets (with SSRMS temporarily powered down), then releasing the other end of the arm at PDGF-4 on the MBS. This new Tip LEE (Latching End Effector) was then maneuvered to focus its camera on the Node nadir CBM (Common Berthing Mechanism) for its inspection by the ground. Other maneuvers to various inspection points followed, before MSS ops ended.]*

FE-1 Kotov performed his last daily inspection of the Russian Kriogem-03M refrigerator with autonomous temperature recorder (ART) in the DC1 (Docking

Compartment), to verify its proper operation. Afterwards, the Kriogem was deactivated, the ART logger data were transferred to TP2 (Laptop 2) and the refrigerator disconnected from its power source, but remaining in the DC1. *[When in use, the Kriogem is temperature-controlled by the TBU-04 (Universal Bioengineering Thermostat), now stowed again in the FGB with the ART.]*

CDR Yurchikhin and FE-2 Anderson performed the mandatory OBT (onboard training) emergency event drill for new crewmembers, for the case of rapid cabin depressurization or fire. Russian and US experts stood by at both control centers for consultation. The rule is that the Russian-led emergency exercise should be performed by every new station crew once within seven days after departure of the previous crew. *[Background: Purpose of the drill for new station residents is to (a) familiarize them with the location of hardware and the positions of valves used in emergency situations, (b) familiarize them with the translation routes to the Soyuz vehicle, (c) work through the Russian Segment (RS) hardware deactivation procedures, (d) familiarize them with the particulars of the scenario and the results of the previous US Segment (USOS) fire drill, and (d) practice crew interactions in emergency situations. Referring to EMER book crew procedures, first Clay and Fyodor translated along the emergency egress path to the FGB nadir port (where Soyuz TMA-10 is currently docked), checking hardware such as the Sokol suits, cable cutters, fire extinguisher (OKR), gas masks (IPK), emergency procedures books, valve settings, hatch rubber seal & restraint integrity, etc. In the USOS the inspection focused on fireports in the Lab, Node and Airlock, readiness of CSA-CP (Compound Specific Analyzer-Combustion Products), ISS leak kit, PBAs (portable breathing assemblies) and PFEs (portable fire extinguishers), emergency procedures books, valve settings, integrity of hatch rubber seals, presence of hatch handrails, etc. The exercise was topped off by a thorough debrief with the ground via S-band. During the session, the crew simulated executing the planned emergency procedures while moving about the station. For the case of an onboard fire and for emergency descent, there are other mandatory emergency drill OBTs.]*

Later, Yurchikhin and Kotov completed the installation of the new replaceable SMOK condensate removal lines in the Thermal Control System (STR) in the Service Module (SM), replacing the older MOK hoses for the SKV air conditioners. *[The hardware for the outfitting R&R, essentially an interconnected set of flexhoses with T-adapters (TR) plus inlet fittings at the condensate removal pumps (NOK1/2) and condensate collector tank (SBA), was set up yesterday by Fyodor.]*

Working on the SM's SOZh (Environment Control & Life Support System) plumbing system, the CDR also removed & replaced the gas-liquid mixture filter (FGS) in the powered-down condensate water processor (SRVK-2M).

The FE-1 performed the periodic O<sub>2</sub> sensor adjustment on the Russian IK0501 gas analyzer. *[IK0501 is an automated system for measuring CO<sub>2</sub>, O<sub>2</sub>, and H<sub>2</sub>O in the air as well as the flow rate of the gas being analyzed.]*

Yurchikhin took the periodic (generally monthly) health test with the cardiological experiment PZEH MO-1 “Study of the Bioelectric Activity of the Heart at Rest” on the TVIS (Treadmill with Vibration Isolation System), assisted by Kotov. *[During the 30-min. test, the crew tagged up with ground specialists on Russian ground site (RGS) passes via VHF (~5:02am EDT) and downlinked data from the Gamma-1M ECG (electrocardiograph) for about 5-6 minutes.]*

After preparing the auditory test equipment, Clay Anderson took the periodic O-OHA (on-orbit hearing assessment) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC (Medical Equipment Computer) laptop application. It was Clay’s first audiogram session. *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month. Note: There have been temporary hearing deficits documented on some U.S. and Russian crewmembers, all of which recovered to pre-mission levels.]*

Anderson also started his support of the SLEEP (Sleep-Wake Actigraphy and Light Exposure during Spaceflight) experiment, first downloading Sunita’s data from her 12A.1 Actiwatch into the software application on the HRF-1, then downloading, initializing and donning his own Actiwatch. *[Purpose of the experiment is to document the effects of long duration spaceflight on sleep-wake activity patterns using the wrist-worn the Actiwatch. The latter is a small light-weight activity & light recording device for the entire duration of their mission. The sleep-wake activity and light exposure patterns obtained in-flight will be compared with baseline data collected for two weeks between Launch (L)-120 and L-75 and from L-11 through L-0. Recovery from spaceflight will also be assessed from Return (R)+0 through R +7. These data should help in understanding the effects of spaceflight on sleep as well as aid in the development of effective countermeasures for both short and long-duration spaceflight.]*

Clay completed the regular bi-weekly maintenance reboot of the SSC (Station

Support Computer) File Server and OCA Comm Router laptops.

For the crewmembers' subsequent workouts on the RED (resistive exercise device), Oleg set up the video camcorder for filming the sessions. Afterwards, the recording gear was disassembled and put away again. *[The RED video, showing the apparatus on the "ceiling" hatch of the Node, is periodically required to support biomechanical evaluation of the exercising crewmember and assessment of the on-orbit setup of equipment during data collection.]*

The crew performed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR/MO-1, FE-1), RED resistive exerciser (FE-1, FE-2), and VELO bike with bungee cord load trainer (CDR).

Afterwards, Kotov transferred the exercise data files to the MEC, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

In the US Airlock, Clay Anderson terminated regeneration of the last METOX (Metal Oxide) canister using during the 13A EVAs. *[Recyclable METOX cans, with their absorbed CO<sub>2</sub> "baked-out" in a hot oven, replaced the old one-way LiOH (Lithium Hydroxide) cartridges in EMUs in 2002.]*

The FE-2 performed the standard "zero" calibration on the newly arrived CSA-CP (Compound Specific Analyzer-Combustion Products) units, then compared values as a check. *[Afterwards, the backup unit, #1060, was stowed, while the prime unit, #1057, was deployed at the SM Central Post.]*

Anderson also used the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit) for the regular atmospheric check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide). Batteries were to be replaced if necessary. *[CSA-O<sub>2</sub> measurements were gathered with the new 13A units #1056 & #1059 for recording O<sub>2</sub> in the Lab, and with the CDMK #1007 for CO<sub>2</sub> in SM and Lab, along with battery ticks. The instruments were turned off afterwards.]*

Clay had another "free" hour set aside on his timeline for ISS familiarization & adaptation, to help in adjusting to his new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

At ~3:55am EDT, the crew held the regular (nominally weekly) tagup with the

Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~4:10am EDT, Fyodor and Oleg linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Discussions today concerned Orlan equipment stowage, current locations of vacuum pressure gauges and a fire extinguisher, etc.]*

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio was conducted at ~9:15am.

*TVM/TsVM Update:* During his troubleshooting of the Russian Central Computer (TsVM) and Terminal Computer (TVM) yesterday, Yurchikhin removed the secondary power supply bypass jumpers of the two TsVM1 & TVM2 data processing units (lanes), which are not in the controlling sets, and then attempted to restart the two lanes. The attempt was unsuccessful, and the by-pass jumpers were reconnected, awaiting further troubleshooting.

*MBSU Software Hitch:* MBSU-1 (Main Bus Switching Unit 1) in the electrical power management circuitry has experienced a health flag (i.e., a bit flip), although the unit continues to operate fine. The flag cannot be cleared at present and is inhibiting RBI (Remote Bus Isolator) commanding from the PMCU (Power Management Controller), as it is programmed to do in a worst-case situation (which this isn't). A new workaround software procedure is being developed.

Today's CEO (Crew Earth Observation) photo targets were **Lake Nasser, Toshka Lakes, Egypt** (*the Lake Nasser, Toshka Lakes region has been documented since 1997. Over 10 years researchers have witnessed through astronaut imagery the creation and filling of the lakes. Lately they have noticed further modification, namely the lowering of lake levels. The crew has been asked to continue to document lake levels. Looking right or east of ISS track, towards Lake Nasser to see the Toshka Lakes*), **Santa Barbara Coast, California** (*Santa Barbara is one of the LTER [Long Term Ecological Research] sites. The weather probably did not permit the crew to take images of the Northern Channel Islands Archipelago, however, Santa Barbara and further inland should have been visible. Scientists are interested in boundary changes between urban and ecosystem boundaries. ISS track should have run directly over the city*), and **Slate Islands, Lake Superior, Ontario, Canada** (*the Slate Islands are the remnant of an impact about 450 million years ago. Located in the northern end of Lake Superior, the Slate Islands impact crater is 30 km in diameter*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 3:41am EDT [= epoch]*):

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Perigee height -- 330.2 km  
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Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0007709  
Solar Beta Angle -- 5.0 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in the last 48 hours -- 77 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49158

**Significant Events Ahead** (*all dates Eastern and subject to change*):

07/13/07 -- FGB solar array retraction  
07/13/07 -- ESA ships ATV "Jules Verne" to Kourou/French Guyana  
07/19/07 -- Progress M-59/24P undocking (DC1) & reentry  
07/20/07 -- US EVA-9  
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08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
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10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks [*under review*]  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10

11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
01/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 06/21/07

**Date:** Thursday, June 21, 2007 2:14:33 PM

**Attachments:**

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### **ISS On-Orbit Status 06/21/07**

All ISS systems continue to function nominally, except those noted previously or below. *Today, Summer began at 2:06pm EDT (Summer Solstice).*

**STS-117/Atlantis lingers for an additional day in space** (EOM+1), after wave-off of today's two KSC landing opportunities due to weather. Tomorrow (Friday), there will be two opportunities for KSC and three for EDW (after an orbit-adjust burn later today).

The ISS crew enjoys a light-duty day, with its sleep/work cycle back to normal (wake-up 2:00am EDT, sleep 5:30pm).

After breakfast, FE-1 Kotov performed his daily inspection of the Russian TBU (thermostat)-controlled Kriogem-03M refrigerator with autonomous temperature recorder (ART) in the DC1 (Docking Compartment) to verify its proper operation. *[Temperature has been set to +4 degC and is being checked every day for a week on the display and ART.]*

Kotov also began a two-day outfitting job on the Russian thermal control system (STR) in the Service Module (SM), continuing Tyurin's work to restore the SKV air conditioning by replacing nominal condensate removal lines (MOK) with new replaceable lines (SMOK), essentially an interconnected set of flexhoses with T-adapters (TR) plus an inlet fittings at the condensate removal pumps (NOK1/2) and condensate collector tank (SBA). Today's job was to assemble the SMOK flexible line set, readying it for tomorrow's installation.

FE-2 Anderson conducted the weekly 10-min CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card, to be updated with today's data,*

*lists 27 water containers (~1023 liters total) for the four types of water identified on board: technical water (714.5 l, for Elektron, flushing, hygiene), potable water (265.1 l), condensate water, waste and other. The potable water transferred from the Shuttle is not to be used at present due to lack of sufficient biocide, until samples returned to Earth have been analyzed and cleared.]*

CDR Yurchikhin performed repair on the Russian BITS2-12 onboard telemetry measurement system (after turning it plus VD-SU control mode off), replacing a failed first-string transmitter (ShA575L) with a spare. The activity was supported by tagup with TsUP specialists and updated in the IMS (Inventory Management System).

Afterwards, Yurchikhin set up the two data processing units (lanes) TsVM1 & TVM2 of the Russian Segment's TsVM (Central Computer) and TVM (Terminal Computer) that were put in "cold standby", and took them through a health testing program from the SM's integrated control panel #1 (InPU-1), doing checks several times during the day over Russian ground sites (RGS) while tagging up with ground specialists via VHF. *[These same computers with triple-redundant data processing "lanes" are also used on the European ATV (Automated Transfer Vehicle) and on the Columbus module.]*

Anderson conducted the periodic (every two weeks) inspection of the RED (Resistive Exercise Device) with canister cords and accessory straps as well as the canister bolts for re-tightening if required.

Afterwards, Clay powered up and connected the CUP PCS (Cupola Robotic Workstation Portable Computer System) laptop, following it later with a one-hour review of the POC DOUG (Portable Onboard Computer Dynamic Ubiquitous Graphics) software for tomorrow's planned SSRMS (Space Station Remote Manipulator System) activities. *[DOUG is a software application that provides a graphical birdseye-view image of the external station configuration and the SSRMS (Space Station Remote Manipulator System), showing its real-time location and configuration on a laptop during its operation. Objective of tomorrow's Robotics ops is to walk-off the SSRMS, currently "folded" double-grappled on the MBS/MT (Mobile Base System/Mobile Transporter), to the Lab PDGF (Power & Data Grapple Fixture) in order to support the Node nadir CBM (Common Berthing Module) inspection to be performed by MCC-H using SSRMS ground control.]*

The CDR worked on activating the Elektron oxygen (O<sub>2</sub>) generator at 32A, monitoring the external temperature of the Elektron's secondary purification unit (BD) for the first 10 minutes of operations to ensure no overheating, a standard precaution. *[During nominal operations a gas analyzer is utilized to detect*

*hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

The FE-2 disassembled and stowed the BPSMU (Battery Powered Speaker Microphone Unit) with its drag-through cable and QDs (quick disconnects) along with video adapter cables, all used by the Shuttle crew during the docked phase with the Orbiter.

Oleg Kotov performed the daily routine maintenance of the SOZh environmental control & life support systems (ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

In the US Airlock, Clay Anderson terminated METOX (Metal Oxide) canister regeneration and initiated the bake-out process on another one of the recyclable CO<sub>2</sub> absorption cans which replaced the previously used one-way LiOH (Lithium Hydroxide) cartridges in 2002.

The three crewmembers performed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), on TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

Afterwards, Anderson transferred the exercise data files to the MEC (Medical Equipment Computer), as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:45am EDT, the station residents conducted a 15-min. audio conference with the Expedition 13 and 14 crews, “comparing notes”.

Today’s CEO (Crew Earth Observation) photo targets were **Karakoram** (*this rugged mountain range spans the borders of Pakistan, China, and India. Of interest is the vast expanse of very long valley glaciers. Winter snow cover is almost gone and these features should be well-exposed. On this fair weather pass in good light, trying for overlapping contextual views of the area*), **Bigach Impact Crater** (*the crew had a fine, nadir pass over this 8-km in diameter impact site estimated to be only 2 to 8 million years old. It is situated in a rugged area about 140-km west of Lake Zaysan. Using the long lens settings for detailed views*), and **Tunis, Tunisia** (*the Tunisian capital is also a port city situated on the Gulf of Tunis in the northeastern part of the country. The metropolitan area is estimated to be approaching 2 million. On this near-nadir pass in high sun and fair weather the crew was to look just right of track and try to map in detail the southern and western*

*margins of the urban area).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (*all dates Eastern and subject to change*):

06/22/07 -- STS-117/Atlantis/13A KSC or EDW landing (TBD)

07/13/07 -- FGB solar array retraction

07/13/07 -- ESA ships ATV “Jules Verne” to Kourou/French Guyana

07/19/07 -- Progress M-59/24P undocking (DC1) & reentry

07/20/07 -- US EVA-9

07/20/07 -- Progress M-61/26P launch

07/22/07 -- Progress M-61/26P docking (DC1)

07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/09/07 -- “Not earlier than” (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking

08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking

08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing

08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*

09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1) & reentry

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)

10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing

10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 “Harmony”, racks *[under review]*

10/20/07 -- (NET) STS-120/Discovery/10A docking

10/22/07 -- (NET) Node 2 relocation

10/29/07 -- (NET) STS-120/Discovery/10A undocking

11/06/07 -- US EVA-10

11/14/07 -- US EVA-11

11/20/07 -- US EVA-12

12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- (NET) STS-122/Atlantis/1E docking

12/12/07 -- Progress M-62/27P launch *[to be reviewed]*

12/13/07 -- (NET) STS-122 undocking

12/14/07 -- Progress M-62/27P docking

01/??/08 -- ATV-1 “Jules Verne” launch/Ariane V (Kourou, French Guyana)

02/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/20/07  
**Date:** Wednesday, June 20, 2007 2:15:45 PM  
**Attachments:**

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### **ISS On-Orbit Status 06/20/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 13 for STS-117. Day 193 in space for Sunita Williams – now aboard Atlantis.*

The crew enjoys an off-duty day, with wake-up this morning at 4:00am EDT, sleep time tonight at the regular 5:30pm. *[With wake-up tomorrow at 2:00am, sleep cycle on board ISS will return to full nominal.]*

After breakfast, FE-1 Kotov performed his daily inspection of the Russian thermostat (TBU)-controlled Kriogem-03M refrigerator with autonomous temperature recorder (ART) in the DC1 (Docking Compartment) to verify its proper operation. *[Temperature has been set to +4 degC and is being checked every day for a week on the display and ART.]*

FE-2 Anderson worked in the US Airlock to restow EVA tools and equipment used in the 13A spacewalks and to make early preparations for the Stage EVA-9 next month.

Anderson then terminated METOX (Metal Oxide) canister regeneration and initiated the bake-out process on another one of the recyclable CO<sub>2</sub> absorption cans which replaced the previously used one-way LiOH (Lithium Hydroxide) cartridges in 2002.

Clay also conducted the periodic status checkup & filter inspection of the running CSI-4/5 (CGBA Science Insert 4/5) payload of seed germination modules and nematode worms housed in the CGBA (Commercial Generic Bioprocessing Apparatus) incubator. *[The incubator is controlled from the ground with automatic video downlinked to Earth. Students in the U.S. and Malaysia are participating in educational activities in their classrooms while monitoring the growth in orbit.]*

CDR Yurchikhin performed the daily routine maintenance of the SOZh environmental control & life support systems (ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables and today also the periodic (~monthly) inspection/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM. *[Progress-PrK, PrK-RO, RO-PkhO, PkhO-DC1, DC1-Progress, PkhO-FGB PGO, FGB PGO-FGB GA, and FGB GA-Node.]*

The FE-2 spent ~15 min on updating Stage 13A SODF (Station Operations Data File) books in the ISS with new procedures delivered by STS-117. *[Updates involved the Medical Checklist, SM Procedures, Warning, and Leak Pinpoint Repair Kit books. Old pages were pulled and discarded.]*

The crew performed their regular daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), with Clay now on full protocol, on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

Afterwards, Anderson transferred the exercise data files to the MEC (Medical Equipment Computer), as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The Shuttle crew meanwhile completed the late inspection of the Atlantis TPS (Thermal Protection System) yesterday with the OBSS (Orbiter Boom Sensor System) and today ran successful checkout tests of the FCS (Flight Control System) and a hot firing of the RCS (Reaction Control System). The crew also is busy with cabin stow activities.

At ~3:03pm EDT, the seven-member Atlantis crew is scheduled for a TV/PAO media event, talking for 6-7 min each with representatives of NBC (Tom Costello), ABC (Gina Sunseri), and CNN (Miles O'Brien).

**STS-117 landing** at KSC is set for tomorrow (6/21, Thursday) at ~1:55pm EDT, after de-orbit burn at 12:53pm on Orbit 202, weather permitting. There are one alternative (wave-off) opportunity at KSC (Orbit 203) and two opportunities at EDW tomorrow (Orbits 204/205). On 6/22 (Friday), there are again two opportunities each at KSC (Orbits 218/219) and EDW (Orbits 220/221), the same as on 6/23 (Saturday). In addition, on 6/23 there are also two opportunities at White Sands Space Harbor. *[If the landing occurs at KSC on the 1<sup>st</sup> Opportunity as planned, Atlantis' mission duration will have been 12d 18h 17m. Sunita's new women-in-space record will then be 193d 17h 8m.]*

*Saturday Science Update:* A list of five suggested activities for the voluntary “Saturday Science” program on 6/23 was uplinked for Clay’s choice. [The five choices are (1) a new run of CFE VG1 (Capillary Flow Experiment – Vane Gap 1), (2) SPHERES, with two & three satellites (formation flying, “lost in space” & other algorithms), (3) EPO (Education Payload Operations) Sports Demo (advantages, disadvantages, and adaptation required for playing sports in micro-G, (4) EPO Hobbies Demo (how crewmembers spend some of their personal time on orbit), and (5) BCAT-3 (Binary Colloidal Alloy Test 3), using the CGBA-1 (Commercial Generic Bioprocessing Apparatus) powered up beforehand by the ground).]

No CEO (Crew Earth Observation) photo targets uplinked for today. There are no CEO targets during the current joint ops period due to unfavorable lighting conditions and task loading.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (all dates Eastern and subject to change):

06/21/07 -- STS-117/Atlantis/13A KSC landing (~1:55pm)  
07/13/07 -- FGB solar array retraction  
07/13/07 -- ESA ships ATV “Jules Verne” to Kourou/French Guyana  
07/19/07 -- Progress M-59/24P undocking (DC1) & reentry  
07/20/07 -- US EVA-9  
07/20/07 -- Progress M-61/26P launch  
07/22/07 -- Progress M-61/26P docking (DC1)  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/09/07 -- “Not earlier than” (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [under review]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 “Harmony”, racks

*[under review]*

10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
01/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/19/07  
**Date:** Tuesday, June 19, 2007 1:27:38 PM  
**Attachments:**

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### **ISS On-Orbit Status 06/19/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 12 for STS-117. Day 192 in space for Sunita Williams – now aboard Atlantis.*

#### **Atlantis and ISS are flying in separate orbits again.**

After final preparations on both sides of the hatches (closed last night at 6:51pm EDT), Atlantis undocked smoothly from PMA-2 (Pressurized Mating Adapter 2) at 10:42am, after a total docked time of 8d 19h 6m. *[For undocking, the station was turned 180 deg to +XVV ZLV (+x-axis in velocity vector, z-axis in local vertical) at 8:08am, put briefly on free drift for the undocking, and then remained in 13A Stage attitude of +XVV TEA attitude at 11:24am. Atlantis backed away from PMA-2, then performed a 1.25-lap flyaround at 400-600 ft while obtaining stunning imagery of the (now no longer lopsided) station and being video-recorded itself by CDR Yurchikhin with his camcorder. A 1.5 ft/s separation burn followed at 11:57am on the +V bar (i. e., in front of the ISS) and a second at 12:25pm (1.0 ft/s, posigrade).]*

KSC landing of STS-117 is set for 6/21 (Thursday) at ~1:54pm EDT, after de-orbit burn at 12:52pm, weather permitting. *[If the landing occurs on the 1<sup>st</sup> Opportunity as planned, Atlantis' mission duration will have been 12d 18h 16m.]*

Aboard the station, the crew is enjoying a light-duty day. After wakeup at ~6:40am EDT, the three station occupants, CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Clay Anderson, went through last-minute preparations for the undocking. *[Sleep time tonight: 7:00pm.]*

Before Atlantis departure, FE-2 Clay Anderson configured the VDS VTR (Video Distribution System/Video Tape Recorder) bypass cables for the CDR to cover the departure.

FE-1 Kotov made sure that the Lab science window was shuttered for protection against jet plumes during the undocking, and Yurchikhin powered down nonessential PCS (Portable Computer System) laptops in the ISS.

Before and during the undocking, Kotov also stood by at a laptop with a stopwatch to monitor the proper performance of automatic undocking software for the PMA-2 departure under Russian thruster control. *[The procedure provides for the crewmember to take over the automatic operational attitude control sequence manually if the software does not resume control after the period of free drift a few minutes after physical separation.]*

After Shuttle departure, Anderson deactivated the CDRA (Carbon Dioxide Removal System) in the Lab.

Assisted by Kotov, Clay then depressurized the PMA-2 to prevent humidity condensation and pressure fluctuations. Leak checking followed for the standard one hour. Afterwards, the necessary equipment was torn down.

In the Service Module (SM), Yurchikhin restored the RSA-2 S/G (Space-to-Ground) comm configuration on Panel 3.

The FE-1 spent about two hours of major equipment servicing in the ASU toilet facility, changing out all replaceable ASU parts with new components, viz., two receptacles (PR & MP), four hoses, a T-connector, an elbow fitting, an indicator, a filter insert (F-V), the pretreat container (E-K) with its hose. All old parts were discarded as trash. *[The Shuttle crew had been given special permission by RSC-Energia to use the ASU, in the interest of minimizing the risk of CMG saturations due to waste water dumps from the Shuttle during the TVM/TsVM computer downtime. E-K contains five liters of pre-treat solution, i.e., a mix of H<sub>2</sub>SO<sub>4</sub> (sulfuric acid), CrO<sub>3</sub> (chromium oxide, for oxidation and purple color), and H<sub>2</sub>O (water). The pre-treat liquid is mixed with water in a dispenser (DKiV) and used for toilet flushing.]*

Fyodor worked in the "Quest" Airlock, terminating regeneration of the first batch of METOX (Metal Oxide) canisters and starting the bake-out on the second batch.

At ~2:50pm, the CDR conducted an amateur radio session with youngsters at the 6<sup>th</sup> International Camp Slavic Fellowship, currently taking place at Sochi with students, scientists, professors and regional administrators from the Russian Federation, Byelorussia, Ukraine, Bulgaria, Serbia, and Montenegro. *[This session had originally been scheduled (and reported here) on 6/14, but was postponed due to the computer breakdown.]*

Afterwards, Clay was to check out the SM Kenwood radio equipment, setting it up for “unattended Packet” mode (PM4) to be used in the upcoming Field Day of the ARRL (American Radio Relay League). *[The ARRL Field Day in Alabama on 6/23-24 has the objective to involve as many stations as possible on any and all amateur bands (excluding the 60, 30, 17, and 12-meter bands) in active exchanges and in doing so to learn to operate in abnormal situations in less than optimal conditions. A premium is placed on developing skills to meet the challenges of Emergency Preparedness as well as to acquaint the general public with the capabilities of amateur radio. In Huntsville/Alabama, the ARRL will also conduct the annual Huntsville Hamfest at the Von Braun Center on 8/18-19. Interactive sessions with the Kenwood radio in the SM are usually done in modes PM1, PM2 & PM3. Keeping the radio in PM4 allows ground stations to use it as a relay, as during the Field Day. To restore the Kenwood to normal operations, software and a computer would be required.]*

The crew completed their daily physical workout program (about half of which is used for setup & post-exercise personal hygiene), today reduced to one hour for Fyodor and Oleg but two hours for Clay, on the TVIS treadmill (FE-2), RED resistive exerciser (FE-1, FE-2), and VELO bike with bungee cord load trainer (CDR).

Working from the Russian voluntary “time permitting” task list, Oleg performed a run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the SONY PD-150P camcorder from SM window 7 to record first-hand data about water circulation, river runoff (ORS), ocean color blooms (TsKO) and ocean bottom relief impacts on the formation of Atlantic Ocean bioproduktive areas at the beginning of winter in the southern hemisphere, as well as cloud pattern irregularities along the flight path (SNPO). *[Uplinked target zones were in the South Atlantic the Brazilian & Falkland currents convergence area, Gulf of Guinea, Gulf of Argentina, and coastal Mauritanian upwelling areas off Africa’s NW coast, and in the Northern Atlantic Nicaragua’s Caribbean coast and offshore Ireland.]*

As also suggested on the discretionary job list, Fyodor conducted a session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D2X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature. *[Today’s Uragan photo targets were the Altai mountains, the south shore of Lake Baikal, the Caspian Sea with oil contamination, central Russia with a series of trial shots showing the Oka, Ugra and Don rivers, and Peru with the Huascaran Glacier.]*

*Saturday Science Update:* A list of five suggested activities for the voluntary “Saturday Science” program on 6/23 was uplinked for Clay’s choice, to be made by

tonight. [The five choices are (1) a new run of CFE VG1 (Capillary Flow Experiment – Vane Gap 1), (2) SPHERES, with two & three satellites (formation flying, “lost in space” & other algorithms), (3) EPO (Education Payload Operations) Sports Demo (advantages, disadvantages, and adaptation required for playing sports in micro-G, (4) EPO Hobbies Demo (how crewmembers spend some of their personal time on orbit), and (5) BCAT-3 (Binary Colloidal Alloy Test 3), using the CGBA-1 (Commercial Generic Bioprocessing Apparatus) powered up beforehand by the ground).]

**Rodnik BV-1 Update:** For the water transfer from Progress 25P, Yurchikhin on 6/17 performed the regular tank bladder compression on SM Rodnik tank BV-1 (erroneously reported as BV-2). Afterwards, the KV-1 valve for BV-1 did not fully close, probably due to contamination deposits under the valve seat. The water transfer was then performed next day (6/18), but KV-1 is still indicated as open. The valve will most likely be replaced in the near future.

**Correction:** Total O<sub>2</sub> transferred from STS-117 to the ISS HPTs (High Pressure Tanks) amounted to ~160 lbs, not ~106 lbs as reported yesterday.

No CEO (Crew Earth Observation) photo targets uplinked for today. There are no CEO targets during the current joint ops period due to unfavorable lighting conditions and task loading.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 9:58am EDT [= epoch]):

Mean altitude -- 335.6 km

Apogee height -- 340.8 km

Perigee height -- 330.4 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007799

Solar Beta Angle -- 18.5 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude gain in the last 48 hours -- 341 m (due to Shuttle jets)

Revolutions since FGB/Zarya launch (Nov. 98) -- 49115

**Significant Events Ahead** (all dates Eastern and subject to change):

06/21/07 -- STS-117/Atlantis/13A KSC landing (~1:54pm)  
07/13/07 -- FGB solar array retraction  
07/13/07 -- ESA ships ATV to Kourou/French Guyana  
07/19/07 -- Progress M-59/24P undocking (DC1) & reentry  
07/20/07 -- US EVA-9  
07/20/07 -- Progress M-61/26P launch  
07/22/07 -- Progress M-61/26P docking (DC1)  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks *[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
01/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking

04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 06/18/07  
**Date:** Monday, June 18, 2007 2:10:35 PM  
**Attachments:**

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### **ISS On-Orbit Status 06/18/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 11 for STS-117; Day 9 of Joint Ops (last day). Day 191 in space (189 on ISS) for Suni - and time for her farewell. Underway: Week 9 of Increment 15.*

**Go for STS-117 undocking** was given officially by the IMMT (ISS Mission Management Team) after two confidence-building events: the successful dynamic (firing) test of Progress thrusters at ~10:28am EDT, confirming full stability and functionality of the recovered Russian TVM & TsVM computers in the Service Module (SM), and the earlier attitude maneuvering of the stack to complete the scheduled waste water dump from the Shuttle (~9:00am), both events requiring several smoothly executed handovers between US and Russian motion control systems.

After crew wakeup at ~7:10am EDT, the ten station occupants had a busy schedule with preparations for tomorrow's Atlantis undocking (~10:42am EDT). *[Sleep time tonight: 10:10pm (ISS); wakeup tomorrow: 6:40am.]*

CDR Yurchikhin spent several hours with setting up water transfer from the Progress M-60/25P BV1 storage tank to the SM's BV1 "Rodnik", monitoring the transfer and terminating it with close-out ops.

After the water transfer is complete later today, Yurchikhin will reverse the process and pump over liquid waste (urine) from EDV-U containers from the SM to the emptied 25P BV1 tank. *[Today's transfer involves 2-3 containers. The plumbing will be left in place, and the contents of another filled 3-4 EDV-U's will be transferred during the next few days as part of regular SOZh maintenance activities.]*

Continuing the extended leak checking of the spare BZh Liquid Unit (#056) for the

Elektron O<sub>2</sub> generator, the CDR today charged the unit once again with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#23). The last test pressurization was done by Mikhail Tyurin on 4/6. *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

FE-1 Kotov performed the periodic checkout of the RSP (Respiratory Support Pack), assisted by FE-2-15 Anderson as part of dedicated handover activities. *[The current RSP, #1004, arrived with 12A.1, replacing the previous pack, #1002.]*

Working jointly with Kotov and Anderson, FE-2 Williams had about 1.5 hrs to maneuver the SSRMS (Space Station Remote Manipulator System), located at WS-3 (Worksite 3), to perform a double-grapple of PDGF-4 (Power & Data Grapple Fixture 4) on the MBS (Mobile Base System) atop the MT (Mobile Transporter). *[The MT with the SSRMS was translated last night by ground-commanding from WS-3 to WS-1, on the new S3 truss, for WS-1 checkout, i.e., confirmation of redundant power strings (which went nominally) and later returned to WS-3 (CMG momentum peaked at 55%). A successful checkout of WS-1 and the translation path was required to support S5 installation on Flight 13A.1. The Canadian-built MBS is a movable aluminum work platform on the US-built MT to carry the SSRMS and other equipment along rails running the length of the ISS main truss. The ISS will have ten different work sites. SSRMS could walk end-over-end (inchworm-like) to move on the station, but the MBS gives it a greater range. More importantly: walking the Canadarm-2 end-over-end would tie up both ends when it moves, so it couldn't carry equipment for repair and construction jobs as it changes location.]*

Oleg Kotov ran the periodic cabin atmosphere test by sampling in the SM with the CMS (Counter Measure System) Trace Contaminant Analyzer. *[CMS allows real-time gas monitoring of potential harmful contaminants (HCHO/Formaldehyde, CO/Carbon Monoxide, NH<sub>3</sub>/Ammonia, O<sub>3</sub>/Ozone, plus Benzene) in special CMS chip cassettes. All measured data are later to be dumped from memory device to the ground via OCA.]*

Later today, Kotov will also collect the periodic ISS cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Fyodor Yurchikhin took water samples, today collecting potable water from the Water Distribution & Heating Unit (BRP-M), heating it up and draining it into an EDV

sample container. A specimen for return to Earth will be taken tomorrow. The water used for line flushing will be disposed of into an EDV container, to be used as EDV-U for liquid waste. *[Curiously, there is no really cold water on tap in the ISS.]*

The CDR conducted the periodic/long-term visual inspection of the pressure hull in the SM Working Compartment (RO), behind panel 139, looking for any moisture, deposits, mold, corrosion, cavities and pitting. *[Fyodor inspected the hull surface, which is coated with a primer and dark-green enamel, using cleaning napkins to wipe the area in question if required and reporting results to the ground.]*

Sunita Williams terminated her part in the SLEEP (Sleep-Wake Actigraphy and Light Exposure during Spaceflight) experiment, by taking off and stowing her Actiwatch. Clay Anderson will download its accumulated data later. *[To monitor the crewmembers' sleep/wake patterns and light exposure, the special Actiwatch device measure the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition.]*

Suni worked with Clay and Bru Archambault on finishing up with cargo transfers between ISS and Shuttle, and Pat Forrester and Steven Swanson performed post-EVA reconfigurations & EVA equipment transfers back to the Atlantis.

Suni and Clay are also to pack the science samples of TROPI (Study of Novel Sensory Mechanism in Root Phototropism) and CARD (Investigation of Mechanisms of Heart Disease with New Portable Equipment), kept in cold storage in the MELFI, into DCB (Double Coldbag) with ICEPAC for return on the Shuttle. *[During the transfer, the samples should not be exposed to ambient air for more than a few minutes, - three minutes in the case of TROPI, or science would be lost.]*

In addition, Suni will deactivate the CSI-1/CGBA (CGBA Science Insert #1/ Commercial Generic Bioprocessing Apparatus) experiment, uncable and inspect it. She will then remove the CHab1 & 2 Habitats and transfer them to the Shuttle for return to Earth home on 13A.

Oleg took the monthly sensor readings of the Russian "Pille-MKS" radiation dosimetry experiment, which has ten sensors placed at various locations in the Russian segment (port cabin window, starboard cabin window, ASU toilet facility, control panel, etc.).

Later in the afternoon, Kotov and Forrester will tear down the O<sub>2</sub> transfer equipment between Shuttle and the ISS HPTs. *[With the first 40 lbs of oxygen transferred on 6/16, the Shuttle has provided a total of ~106 lbs O<sub>2</sub> to the station.]*

FE-1 Kotov checked to verify proper operation of the Russian TBU/Thermostat-controlled Kriogem-03M refrigerator with autonomous temperature recorder (ART), installed yesterday in the DC1 (Docking Compartment), by monitoring the temperature, set at +4 degC, on the display and ART for a week.

Joined today for the second time by Clay Anderson for about an hour of exercise, the ISS crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-1, FE-2-15), TVIS treadmill (FE-2), RED resistive exerciser (CDR, FE-1, FE-2), and VELO bike with bungee cord load trainer (CDR).

Later today, Clay will transfer the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Tonight's scheduled pre-undocking steps are –

- ~6:25pm EDT: Farewell ceremony between ISS and Atlantis crew;
- Egress of the seven Shuttle crewmembers (Rick, Bru, Pat, Swanny, Danny, JR, and Suni);
- ~6:38pm: hatch closing, and
- ODS (Orbiter Docking System) vestibule depress (~7:08pm) and one-hour leak checking between PMA-2 and vestibule.

Undocking of the Shuttle is scheduled for tomorrow at ~10:42am EDT, KSC landing on 6/21 (Thursday) at ~1:54pm.

No CEO (Crew Earth Observation) photo targets uplinked for today. There are no CEO targets during the current joint ops period due to unfavorable lighting conditions and task loading.

CEO photography can be viewed and studied at the websites:

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 9:32am EDT [= epoch]*):

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Perigee height -- 329.8 km

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Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0008084  
Solar Beta Angle -- 23.2 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in the last 48 hours -- 50 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49098

**Significant Events Ahead** (*all dates Eastern and subject to change*):

06/19/07 -- STS-117/Atlantis/13A undocking (~10:42am)  
06/21/07 -- STS-117/Atlantis/13A KSC landing (~1:54pm)  
07/13/07 -- FGB solar array retraction  
07/13/07 -- ESA ships ATV to Kourou/French Guyana  
07/19/07 -- Progress M-59/24P undocking (DC1) & reentry  
07/20/07 -- US EVA-9  
07/20/07 -- Progress M-61/26P launch **[new date]**  
07/22/07 -- Progress M-61/26P docking (DC1)  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks *[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
01/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/??/08 -- ATV-1 docking (SM aft port)

02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
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04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/17/07  
**Date:** Sunday, June 17, 2007 7:54:41 PM  
**Attachments:**

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### **ISS On-Orbit Status 06/17/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday: Flight Day 10 for STS-117; Day 8 of Joint Ops. Day 190 in space (Day 188 on ISS) for Suni (launched 12/9/06 on STS-116). Ahead: Week 9 of Increment 15.*

After crew wakeup at ~7:40am EDT, the ten station occupants again had a busy schedule with a bit more rest. *[Sleep time tonight: 10:40pm (ISS), 11:10pm (STS-117).]*

**EVA-4 was completed successfully** by Pat Forrester (EV3) and Steven Swanson (EV4). The spacewalk began at 12:25pm EDT (8 min ahead of schedule) and ended at 6:54pm, lasting 6h 29m. JR Reilly provided strong IV (intravehicular crewmember) support from the Shuttle flight deck, "shadowed" by Oleg Kotov who familiarized himself for his own IV role during the next US EMU spacewalk (EVA-9), to be conducted by Clay Anderson and Fyodor Yurchikhin in the later part of July from the "Quest" Airlock (A/L).

*It was the 87<sup>th</sup> spacewalk for ISS assembly & maintenance, the 59<sup>th</sup> from the station (28 from Shuttle, 22 from Pirs) totaling 349h 43m, the fourth for Forrester and the second for Swanson. After today's EVA, a total of 95 spacewalkers (68 NASA astronauts, 19 Russians, and eight astronauts representing Japan-1, Canada-2, France-1, Germany-1 and Sweden-3) have logged a total of 537h 7m outside the station on building, outfitting and servicing. It also was the 109<sup>th</sup> spacewalk by U.S. astronauts.*

During EVA-4, Pat and Steve –

- Removed an ETVCG (External TV Camera Group) stanchion from its stowage place on ESP-2 (External Stowage Platform 2) & installed it on the new S3 truss at the CP1 (Camera Port 1) location (face 4);
- Checked out six attachment points of ESP-2 (which has exhibited some

deflections in EVA-3 photogrammetry caused by crew movement, a possible long-term fatigue issue);

- Readied the SARJ (Solar Alpha Rotary Joint) by verifying DLA-2 (Drive Lock Assembly 2) configuration and labeling;
- Removed six remaining SARJ launch restraints, setting up the SARJ for its ground-commanded checkout (Part 1 during crew sleep tonight, at ~11:30pm, with only very small rotation {~5 deg in either direction}, and Part 2 tomorrow with larger rotation, requiring Russian thruster control);
- Removed the drag link/keel pin (required for launch mounting in Orbiter payload bay) from S3 & stowed it on the truss;
- Relocated two APFRs (Articulating Portable Foot Restraints) from S3 to S4 to prepare for S5 truss installation (13A.1 get-ahead tasks);
- Released four bolts of the IEA MMOD (Integrated Equipment Assembly Micrometeoroid/Orbital Debris) shield;
- Cleared the MT (Mobile Transporter) translation path onto S3 by rotating S1 stops out of the way, including a tether shuttle stop, and installing the ETRS (EVA Temporary Rail Stop), to serve as MT and tether shuttle stop mechanism on the S3 truss;
- Routed a Node-to-Service Module (SM) data cable as part of the new ISL (Integrated Station LAN [Local Areas Network]);
- Secured, with some difficulty, the Lab forward endcone MMOD shields after opening (and closing) a panel for the ISL cable installation;
- Opened the new OGS (Oxygen Generation System) hydrogen vent valve & secured the valve's MMOD shield with an additional tether (bolting down had posed problems during EVA-3), and
- Cleaned up by collecting tools & tethers for return to the A/L CL.

However, remaining EVA time did not allow removal of the failed GPS antenna #4, and moving/re-installing the spare SASA (S-band Antenna Structural Assembly) gimbal locks on the Z1 truss.

Earlier, at ~8:15am EDT, the Crewlock (CL) hatch was opened for a 60-min. hygiene break/with mask prebreathe for JR and Danny, after they had "camped out" for the night on 10.2 psi. At ~11:55am, the hatch was closed again for final EVA preps (prebreathe, EMU purge & depressurization below 10.2psi). Pat and Steve were joined in isolation for a while by Olivas and Kotov to assist with EMU purging/prebreathe and CL depress.

For prebreathing in the A/L, the spacewalkers were supplied with O<sub>2</sub> from the Shuttle via transfer jumpers to the A/L PBA (Prebreathe Assembly) ports, installed last night by Rick Sturckow and Jim Reilly.

Tonight after the spacewalk (~8:40pm), Reilly will reconfigured the jumpers to continue O<sub>2</sub> transfer between Shuttle and the ISS HPTs (high-pressure tanks) on the A/L exterior for another planned ~90 lbs of O<sub>2</sub>. *[Yesterday, the oxygen transferred to the ISS HPTs amounted to ~60 lbs. The additional post-EVA transfer of ~90 lbs will not impact Shuttle mission length capability, currently at 13d+2d reserve+1d weather waveoff. Mission length is constrained by cryo-H<sub>2</sub> (hydrogen), used with cryo-O<sub>2</sub> for the electricity-generating fuel cells. The water resulting as a by-product has been collected in the Orbiter in CWCs (Contingency Water Containers) and will be dumped into space tomorrow morning (FD11). Since this requires a special stack attitude, water dumps were not conducted in the last two days because of the TVM/TsVM computer problems (see below).]*

PLT Bru Archambault configured the SSRMS (Space Station Remote Manipulator System) to provide video viewing of the EVA.

FE-2 Williams, assisted by Clay Anderson for “handover” familiarization, completed another CWC audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies.

Williams also worked with Anderson on settings of SSRMS (Space Station Remote Manipulator System) cameras and RWS (Robotics Workstation) overlays for translating the Canadarm 2 from WS-3 (Work Station 3) to WS-1 and back to WS-3. *[The MT will be translated tonight from WS-3 to WS-1 for WS-1 checkout.]*

During the day, Suni and Clay spent a total of about five hours on handover activities, getting the new Flight Engineer familiarized with station systems and ops *[all three ISS crewmembers have time scheduled for handovers with Clay; primary tasks to be worked during these activity blocks are listed in a special digital Handover book in the IPV (International Procedures Viewer).]*

CDR Yurchikhin performed an inventory/audit of Russian Onboard Equipment Control System (SUBA) plug-ins.

Yurchikhin also made preparations for upcoming water transfer from the Progress cargo ship to the SM “Rodnik” tanks, conducting the standard tank bladder leak check by compressing the SM BV2 tank’s bladder. *[The pressurization of the collapsed bladder of the Rodnik water storage tank is conducted in three separate operational steps as a leak check. Each of the two spherical Rodnik tanks consists of a hard shell with a bladder, a soft membrane composed of elastic fluoroplastic, which is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane.]*

Fyodor later conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), the CDR updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Late tonight after the spacewalk, Yurchikhin is scheduled to downlink the EVA-4 photography from the DCS 760 cameras.

FE-1 Kotov checked to verify proper operation of the Russian TBU/Thermostat-controlled Kriogem-03M refrigerator with autonomous temperature recorder (ART), installed yesterday in the DC1 (Docking Compartment), by monitoring the temperature, set at +4 degC, on the display and ART for a week.

Joined today for the first time by Clay Anderson for about an hour of exercise, the ISS crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2-15), TVIS treadmill (FE-1, FE-2), and RED resistive exerciser (CDR, FE-1, FE-2).

### ***Computer Recovery Update:***

Today, after about six hours of checkouts yesterday by Yurchikhin & Kotov (who set everything else aside, including their exercise sessions), -

- All six lanes (subsets) of the Russian TsVM (Central) & TVM (Terminal) computers have been recovered (by jumpering/bypassing each of their secondary power supply circuits) and are back to nominal;
- At present, two lanes on each of the two computers are running, with the remaining two in "cold standby" in case of need;
- All software loads & patches are in place and checked out;
- All RS systems are up and running, except the Elektron oxygen generator (Elektron is powered up but not generating O<sub>2</sub> because the pulled-forward launch date of Progress 26P on 7/20 stipulates using up Progress 25P O<sub>2</sub> stores at a faster rate, relieving Elektron for the time being);
- No RS computer lanes will be returned on the Shuttle;
- Progress 26P will deliver TVM & TsVM spares (two lanes) on 7/22, with modified overvoltage protection added;
- Root cause analysis is continuing at RSC-Energia, and
- A final checkout of the Russian computers will be conducted tomorrow morning with a Progress 25P thruster firing just after the Orbiter water dump.

**OGS Update:** Not reported here yesterday was work performed by the crew internally to install additional OGS (Oxygen Generation System) hardware and performing leak checks on OGS connections to the new H<sub>2</sub> vent valve.

No CEO (Crew Earth Observation) photo targets uplinked for today. There are no CEO targets during the current joint ops period due to unfavorable lighting conditions and task loading.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:42am EDT [= epoch]*):

Mean altitude -- 335.3 km

Apogee height -- 340.7 km

Perigee height -- 329.9 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008036

Solar Beta Angle -- 28.0 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49081

**Significant Events Ahead** (*all dates Eastern and subject to change*):

06/19/07 -- STS-117/Atlantis/13A undocking (~10:42am)

06/21/07 -- STS-117/Atlantis/13A KSC landing (~1:54pm)

07/13/07 -- FGB solar array retraction

07/13/07 -- ESA ships ATV to Kourou/French Guyana

07/19/07 -- Progress M-59/24P undocking (DC1) & reentry

07/20/07 -- US EVA-9

07/20/07 -- Progress M-61/26P launch **[new date]**

07/22/07 -- Progress M-61/26P docking (DC1)

07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking

08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking

08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing

08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
01/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/16/07  
**Date:** Saturday, June 16, 2007 3:30:50 PM  
**Attachments:**

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**ISS On-Orbit Status 06/16/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday: Flight Day 9 for STS-117; Day 7 of Joint Ops. Day 189 in space & Day 187 on ISS for Suni (launched 12/9/06 on STS-116).*

*This morning at 1:47am EDT Sunita broke the record for a single space flight for a woman (previously held by Shannon Lucid with 188d 4h). Congratulations, Suni! Also, today 30 years ago **Wernher von Braun passed away**, at age 65 (gravesite: Ivy Hill Cemetery, Alexandria, VA).*

After crew wakeup at ~8:40am EDT, the ten station occupants again had a busy schedule with a bit more rest. *[Sleep time tonight: 11:08pm (ISS), 11:38pm (STS-117).]*

The crew is working mostly on preparations for tomorrow's EVA-4 spacewalk by MS1 Pat Forrester and MS2 Steven Shannon. *[Objectives of the spacewalk, scheduled to begin Sunday at ~12:45pm, include verification of DLA-2 installation (suspected of being mislabeled for DLA-1), removing the remaining SARJ (Solar Alpha Rotary Joint) launch restraints, stowing the S3 drag link/keel pin, relocating an APFR (Articulated Portable Foot Restraint) and installing MMOD (Micrometeoroid/Orbital Debris) shields bolts, preparing the MT Mobile Transporter translation path, removing GPS-4 antenna, removing SASA (S-band Antenna Support Assembly) gimbal locks, and more.]*

It was CDR Yurchikhin's turn today to set up and perform the Russian MBI-21 PNEVMOKARD experiment, his second session (which forbids moving or talking during data recording). The experiment is controlled from the RSE-Med A31p laptop, equipped with new software, and uses the TENSOPUS sphygmomanometer to measure arterial blood pressure. *[PNEVMOCARD attempts to obtain new scientific information to refine the understanding about the mechanisms used by the cardiorespiratory system and the whole body organism to*

*spaceflight conditions. By recording (on PCMCIA cards) the crewmember's electrocardiogram, impedance cardiogram, low-frequency phonocardiogram (seismocardiogram), pneumotachogram (using nose temperature sensors), and finger photoplethysmogram, the experiment supports integrated studies of (1) the cardiovascular system and its adaptation mechanisms in various phases of a long-duration mission, (2) the synchronization of heart activity and breathing factors, as well as the cardiorespiratory system control processes based on the variability rate of physiological parameters, and (3) the interconnection between the cardiorespiratory system during a long-duration mission and the tolerance of orthostatic & physical activities at the beginning of readaptation for predicting possible reactions of the crewmembers organism during their return to ground.]*

FE-1 Kotov unstowed, installed and tested the Russian TBU/Thermostat-controlled Kriogem-03M refrigerator with ART (Autonomous Temperature Recorder) by setting the temperature at +4 degC, to be monitored on the display and ART for a week.

CDR Sturckow and FE-1 Kotov configured the O<sub>2</sub> (oxygen) transfer between Shuttle and the ISS HPT (high-pressure tank) on the U.S. Airlock (A/L) exterior and initiated the planned transfer of ~40 lbs of O<sub>2</sub>.

Later, Rick and Jim Reilly terminated the oxygen transfer and reconfigured the jumpers to supply O<sub>2</sub> from the Shuttle to the A/L PBA (Airlock Prebreathe Assembly) ports for the subsequent EVA-4 prebreathing by Pat and Steven.

The two spacewalkers worked in the A/L on preparations for tomorrow's EVA-4, swapping the EMU/spacesuits, refilling the PWRs (Payload Water Reservoirs), and prepared the EVA tools.

Also for EVA-4, Kotov terminated the regeneration of METOX (Metal Oxide) CO<sub>2</sub> absorption canisters in the A/L "bakeout" oven.

The CDR turned around the two DCS 760 cameras to ready them for the spacewalk.

Yurchikhin also conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), Fyodor updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Sunita Williams conducted the weekly 10-min. CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies.

Afterwards, Suni spent ~3.5 hrs with Clay Anderson on handover activities, getting the new Flight Engineer familiarized with station systems and ops *[all three ISS crewmembers have time scheduled for handovers with Clay; primary tasks to be worked during these activity blocks are listed in a special digital Handover book in the IPV (International Procedures Viewer).]*

Bru Archambault and Steve Swanson spent several hours with cargo transfers from the Shuttle, guided by an uplinked transfer list.

The FE-1 and CDR had their weekly PFCs (Private Family Conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop), Oleg at 10:30am EDT, Fyodor at 12:18pm.

A final EVA-4 procedures review for all crewmembers is scheduled for ~6:23pm EDT tonight.

At ~7:20pm the ISS and Shuttle crew will assemble in the SM (Service Module) for posing for the standard joint crew photograph.

Afterwards, at ~7:43pm, both crews are scheduled to support a 35-min joint crew news conference conducted with U.S. media at NASA centers. *[Media clients tape the event for use within their respective media outlets.]*

Later, mask prebreathe for Pat and Swanny will begin at ~9:53pm, with subsequent campout depressurization of the A/L CL (Crewlock) to 10.2 psi for their sleep period.

The ISS crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), and RED resistive exerciser (CDR, FE-1, FE-2).

**Computer Recovery Update:** After CDR Yurchikhin & FE-1 Kotov installed bypass jumpers on the Russian TVM (Terminal) and TsVM (Central) computers last night (specifically on subsets TVM1 & TVM3 and TsVM2 & TsVM3), allowing restart of the computers on these subsets, this morning the two computers and the U.S. GN&C (Guidance, Navigation & Control) MDM computers established communication between each other and are back in Ops mode, after running

overnight in Test mode. Russian thrusters are available for desaturation as needed as attitude control mode is back on CMG TA (Control Moment Gyroscope with Thruster Assist). Normal systems conditions are slowly coming back. *[Root cause analysis is underway. One speculation under consideration is that changes in the ground state, i.e. the difference between the vehicle's electrical potential and the surrounding plasma "vacuum", caused sensitive protective secondary power circuitry to turn off the primary power supply on sensing an overvoltage. The jumpers bypass either the sensitive logic or the entire overvoltage protection. A grounding change could have been caused by the addition of the 36,000-lbs S3/S4 truss and a change in the plasma environment or a change in ground path caused by the rewiring and circuit changes. More analyses are required to confirm or change this hypothesis. The ISS is the largest structure ever erected in space, and this situation cannot be tested on the ground. But the experience will help teach us how to build the large space structures of the future.]*

No CEO (Crew Earth Observation) photo targets uplinked for today. There are no CEO targets during the current joint ops period due to unfavorable lighting conditions and task loading.

### **Weekly Science Update** (*Expedition Fifteen -- 8<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Last activities (shielding tile accommodation on ALTEINO device, photo of configuration and memory card exchange, dump of the file 24h later) have been successfully performed by ISS CDR on 6/8 and 6/9. ALTEINO is performing nominally

*ANITA:* Planned.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2:* Planned.

*CFE (Capillary Flow Experiment):* Reserve.

*CHROMOSOME-2 (E14 SFP):* Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* In support for BCAT-3 only.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Complete.

*EMCH (Elastic Memory Composite Hinge):* Complete.

*EPO (Educational Payload Operation) Kit C:* Planned.

*IMMUNO (Saliva Sampling):* Planned.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):*  
Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* Planned

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* Planned.

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* Planned.

*NUTRITION:* Complete.

*SAMPLE:* Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):*  
Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* "Suni: Thanks for completing your last week of sleep logging. Your only remaining on-orbit activity that will be timelined is to doff your Actiwatch. Clay will download it later. Clay: Per the current Increment plan, you have five downloads, three weeks of sleep logs, and a doff activity remaining. We appreciate your participation in this study."

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):*  
Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Last TRAC session performed on ISS by Sunita. Congratulations to Sunita for having kept a brilliant outlook on this experiment! Three PMDIS data sessions were performed on June 6/12. CSA is very happy that the experiment unfolded as planned. Many thanks go to Clay, Pat and Steve for taking time off their busy schedule to work on this science experiment.

*CEO (Crew Earth Observations):* Through 6/13 the ground has received a total of 3,976 CEO images for review and cataloging for Increment 15. "We have suspended our payload operational support until at least 6/20 while our staff supports the STS-117 mission. We have noted that you have continued CEO photography including additional encounters with Iceberg A22A. A pair of your photos of this huge berg will be posted in an article on NASA/GSFC's Earth Observatory website this weekend. Thanks for your continued support!"

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 10:26am EDT [= epoch]*):

Mean altitude -- 335.4 km

Apogee height -- 340.8 km

Perigee height -- 329.5 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008112

Solar Beta Angle -- 32.8 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 200 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49067

**Significant Events Ahead** (*all dates Eastern and subject to change*):

06/17/07 -- EVA-4 (~12:45pm)

06/19/07 -- STS-117/Atlantis/13A undocking

06/21/07 -- STS-117/Atlantis/13A KSC landing (~1:54pm)

07/13/07 -- FGB solar array retraction

07/13/07 -- ESA ships ATV to Kourou/French Guyana

07/20/07 -- US EVA-9

07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/05/07 -- Progress M-59/24P undocking (DC1) & reentry

08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks *[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
01/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking

05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 06/15/07

**Date:** Friday, June 15, 2007 9:46:39 PM

**Attachments:**

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### **ISS On-Orbit Status 06/15/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 8 for STS-117; Day 6 of Joint Ops. Day 188 in space & Day 186 on ISS for Suni (launched 12/9/06 on STS-116),*

After crew wakeup at ~8:40am EDT, the ten station occupants again worked a very busy schedule. [*Sleep time tonight: 11:40pm (ISS), 12:10am (STS-117).*]

**EVA-3 was completed successfully** by Jim Reilly (EV1) and Danny Olivas (EV2). The spacewalk began at 1:24pm EDT with switch to suit power (9 min ahead of schedule) and ended at 9:22pm, lasting 7h 58m. Rick Sturckow and Pat Forrester provided strong IVA support.

It was the 86<sup>th</sup> spacewalk for ISS assembly & maintenance, the 58<sup>th</sup> from the station (28 from Shuttle, 22 from Pirs) totaling 343h 14m, the fifth for Reilly, and the second for Olivas. After today's spacewalk, a total of 93 spacewalkers (66 NASA astronauts, 19 Russians, and eight astronauts representing Japan-1, Canada-2, France-1, Germany-1 and Sweden-3) have logged a total of 530h 34m outside the station on building, outfitting and servicing. It also was the 108<sup>th</sup> spacewalk by U.S. astronauts.

During EVA-3, JR and Danny –

1. Repaired the peeled-back thermal protection blanket on the Orbiter's left OMS pod (*by padding down the loose blanket corner and the lifted leading edge of the adjacent blanket, stapling the first blanket to the adjacent blanket using a medical stapler, and pinning the blanket with 21 stainless steel (NiC) heat-resistant Tile Overlay pins*),
2. Installed the new H<sub>2</sub> (hydrogen) vent valve for the U.S. OGS (Oxygen Generation System) on the Lab, replacing the former H<sub>2</sub>O (water) vent valve, and

3. Effectively supported the complete retraction of the P6 2B SAW (Solar Array Wing) into its box (~8:31pm).

The late-added task of disconnecting the electrical P-12 connector, installed during EVA-1 and forming a putative “sneak circuit” or grounding path to the malfunctioning Russian TVM & TsVM computers in the Service Module (SM), became unnecessary when Moscow ground teams succeeded in restarting the computers on two lanes each during the time of the OMS Pod repair. *[The P-12 connection is not carrying any loads and will only be required for the yet-to-be-delivered S6 truss.]*

Earlier, at ~9:20am EDT, Crewlock (CL) hatch was opened for a 60-min. hygiene break/with mask prebreathe for JR and Danny, after they had “camped out” for the night on 10.2 psi. At ~10:20am, the hatch was closed again for a continued depress period at 10.2, for a total time for EVA preps (prebreathe, EMU purge & depressurization below 10.2psi) of ~3h 20min. JR & Danny were joined in isolation for a while by Steven Swanson & Clay Anderson to assist with EMU purging/prebreathe and CL depress.

Before the spacewalk, FE-1 Oleg Kotov removed the pressure cover of window #13 in the SM PkhO (Transfer Compartment) to allow observation of the 2B SAW retraction from the “backside”, installing it again after the EVA.

FE-2 Sunita Williams and PLT Bru Archambault configured the SSRMS (Space Station Remote Manipulator System) to provide video viewing of the 2B SAW retraction. Bru and Steven subsequently worked the SRMS (Shuttle RM) to support Olivias during the Atlantis OMS Pod repair.

As part of EVA preps, Williams verified powerdown of onboard ham radio equipment (Kenwood in SM & Ericsson in FGB) to prevent RF interference with the EMUs.

Afterwards, Sunita conducted the standard annual one-hour inspection and servicing of the food warmers in the Galley (located in the SM). *[Food warmers, food trays, utensils, etc., are part of the food preparation hardware of the CSS (crew support systems). The food warmers are in recessed wells in the galley table that also has crew and equipment restraints. Besides the galley, the wardroom area also includes a potable water dispenser (for hot and ambient water for drink and food hydration), a trash container, and two refrigerators.]*

Williams also conducted the periodic (every two weeks) inspection of the RED (Resistive Exercise Device) with canister cords and accessory straps as well as the canister bolts on the Node “ceiling” hardmount for re-tightening if required.

Additionally, Sunita –

- Worked in the A/L to terminate BSA (Battery Stowage Assembly) recharging of the EMU batteries used on EVA-2,
- Spent ~2.5 hrs with Clay Anderson on handover activities, getting the new Flight Engineer familiarized with station systems and ops [*all three ISS crewmembers have time scheduled for handovers with Clay; primary tasks to be worked during these activity blocks are listed in a special digital Handover book in the IPV (International Procedures Viewer)*],
- Transferred new CD data storage disks from the Shuttle to the onboard CD Library and removed old CDs from the Library volumes, going by an uplinked detailed listing for both categories [*about 17 CDs were discarded and 27 new ones added, including new ODF (Operations Data File) DVDs*], and
- Is scheduled later to downlink the photo material obtained from today's spacewalk.

The ISS crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), and RED resistive exerciser (CDR, FE-1, FE-2).

The exercise data files were downloaded later by Sunita to the MEC (Medical Equipment Computer), as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

***Russian Computer Systems Update:*** Earlier this afternoon (~4:00pm), Russian ground teams successfully restarted two lanes (subsets) each of the SM Terminal Computer (TVM) and Central Computer (TsVM), after Yurchikhin and Kotov isolated a faulty secondary power supply switch behind SM panels as cause of the computer shutdowns, by bypassing the switch with a jumper cable. The computers later were shut down and then restarted in self-test mode as planned. Telemetry data are now being collected for additional analysis tomorrow morning during RGS passes.

***Background:*** Both computers have identical hardware and service software, and each one is comprised of three identical FCRs (Fault Containment Regions), or "lanes", that are separate ORUs (Orbital Replaceable Units). They were developed by the German company DASA (today Astrium) for ESA and RSC-Energia under contract. The TsVM, acting as C&C (Command & Control) computer, performs integral control tasks for the RS (Russian segment), controlling data streams, communicating with U.S. C&DH (Command & Data Handling), doing autonomous control tasks, etc. The TVM, acting as navigation computer, performs GN&C (Guidance, Navigation & Control) functions, communicating with the U.S. GN&C

MDM and the SUDN (Motion Control & Navigation System) of other RS vehicles, and controls a host of other onboard systems. The probability of a hardware failure in the secondary power supplies of the subsets was discussed by Russian and U.S. experts throughout the day. Earlier in the troubleshooting process, the power feed from the new S4 solar arrays to the RS via SNT (voltage/current stabilizers) #23 & #24 was removed in the Node, but leaving the ground path through P-12 connected. Also, last night the crew used a current scopemeter (oscilloscope) in the Node endcone to check on the “quality” of the current on three wire harnesses that feed power to the RS, in order to determine if EMI (electromagnetic interference) was traveling down one of the lines as “noise” which could upset a noise-sensitive power supply card. Results were evaluated on the grounds, and the S4 power was found “clean” of any noise and was exonerated.

***FGB Power Update:*** When the SM computers came up on one lane each for a short time early this morning, it sufficed for recycling the FGB MDM (Multiplexer/Demultiplexer) computer to connect it to the SM and to activate one ARCU (American-to-Russian Converter Unit) to feed power to the FGB systems. As a result, U.S. power flow to the FGB and Soyuz TMA-10/14S was restored. The Soyuz spacecraft now has its main battery recharged (the entry battery was never touched). Supplying U.S. power via dragthrough cable is being studied as a potential future option.

***SM Systems Update:*** The brief activation of two SNTs and one ARCU allowed Russian specialists to operate one of the SM external thermal loops and improve maintenance of internal temperatures in the SM (stabilizing at ~4 degC above nominal). Elektron (O<sub>2</sub> generation) and Vozdukh (CO<sub>2</sub> removal) were down, but Vozdukh can operate without the TVM, and there is plenty of O<sub>2</sub> on board, to be supplied from Progress tanks as required. Also, the new U.S. OGS (Oxygen Generation System) is scheduled to become operational later during the 13A Stage. The SKV air conditioners remained off during the day, but humidity control is adequately served by the U.S. CCAA (Common Cabin Air Assembly), and specialists are looking at new procedures for using SKV without TVM. The BMP Harmful Impurities Removal System remained active, as did all other RS systems.

***Attitude Control Update:*** The ISS has been in gravity-gradient stabilized attitude to minimize use of the CMG MM (Control Moment Gyroscope/Momentum Management) system. Russian reaction control jets (thrusters) are not required until the ISS needs to maneuver, e.g., for Shuttle undocking attitude, to desaturate the CMGs, or for debris avoidance.

***Joint US/Russian Study Teams:*** Alternative approaches to station attitude control, including off-nominal Shuttle undocking, are being studied by a special

team of U.S. and Russian experts. Other joint teams are investigating (2) the root cause of the computer failures (possibly identified now as the faulty secondary power supply switch), (3) approaches to optimizing ISS configuration without Russian computer control, including critical systems & resources, and (4) updating – where necessary - previously developed and filed de-crewing criteria, including timeline, Soyuz safe departure, and optimum station systems configuration to facilitate subsequent re-crewing.

No CEO (Crew Earth Observation) photo targets uplinked for today. There are no CEO targets during the current joint ops period due to unfavorable lighting conditions and task loading.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:01am EDT [= epoch]*):

Mean altitude -- 335.7 km

Apogee height -- 341.0 km

Perigee height -- 330.3 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007998

Solar Beta Angle -- 37.6 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 30 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49049

**Significant Events Ahead** (*all dates Eastern and subject to change*):

06/17/07 -- EVA-4 (~12:45pm)

06/19/07 -- STS-117/Atlantis/13A undocking

06/21/07 -- STS-117/Atlantis/13A KSC landing (~1:54pm)

07/13/07 -- FGB solar array retraction

07/13/07 -- ESA ships ATV to Kourou/French Guyana

07/20/07 -- US EVA-9

07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/05/07 -- Progress M-59/24P undocking (DC1) & reentry

08/06/07 -- Progress M-61/26P launch

08/08/07 -- Progress M-61/26P docking (DC1)

08/09/07 -- “Not earlier than” (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM,

## S5, ESP3

08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/20/07 -- US EVA-12  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
01/??/08 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
02/??/08 -- ATV-1 docking (SM aft port)  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 06/14/07

**Date:** Thursday, June 14, 2007 4:55:18 PM

**Attachments:**

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### **ISS On-Orbit Status 06/14/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 7 for STS-117; Day 5 of Joint Ops. Day 187 in space & Day 185 on ISS for Suni (launched 12/9/06 on STS-116),*

After crew wakeup at ~8:40am EDT, the ten station occupants again worked a very busy schedule. *[Sleep time tonight: 12:40am.]*

The P6 solar array wing (SAW) 2B remains partially retracted, awaiting manual assistance during one or both of the next two spacewalks. *[Responsibility for retract/abort and MDA (Motor Drive Assembly) "On" commands (when the BGA (Beta Gimbal Assembly) "wiggle" technique is not being used) is with the station crew.]*

FE-2 Williams and PLT Archambault configured the SSRMS (Space Station Remote Manipulator System) to provide video viewing of the retraction. *[Visual inspection is key to providing possible abort criteria to the crew when Ku-band coverage is limited.]*

CDR Yurchikhin, assisted in part by FE-1 Kotov, worked several hours on re-opening access to the Progress M-59/24P cargo ship which was isolated from the DC1 (Docking Compartment) on 5/24 in preparation for the two Orlan EVAs on 5/31 & 6/6. To this end, Fyodor and Oleg –

- Performed the usual one-hour leak check on both hatches,
- Opened the DC1-SU & SU-24P transfer hatches (~2:45pm EDT),
- Installed the quick-release (QR) screw clamps to rigidize the docking joint,
- Deactivated the Progress, and
- Installed the air heater/fan unit & air duct from the passageway, as well as the IP-1 airflow meter.

Yurchikhin performed preventive maintenance/servicing on RS (Russian segment) ventilation systems in the Service Module (SM), cleaning Group A fans and changing out the cartridges of the four dust filters (PF1-4).

Oleg Kotov unstowed and set up the equipment for the Russian MBI-21 PNEVMOKARD experiment, then performed his second session (which forbids moving or talking during data recording). The experiment is controlled from the RSE-Med A31p laptop, equipped with new software, and uses the TENSOPPLUS sphygmomanometer to measure arterial blood pressure. *[PNEVMOCARD attempts to obtain new scientific information to refine the understanding about the mechanisms used by the cardiorespiratory system and the whole body organism to spaceflight conditions. By recording (on PCMCIA cards) the crewmember's electrocardiogram, impedance cardiogram, low-frequency phonocardiogram (seismocardiogram), pneumotachogram (using nose temperature sensors), and finger photoplethysmogram, the experiment supports integrated studies of (1) the cardiovascular system and its adaptation mechanisms in various phases of a long-duration mission, (2) the synchronization of heart activity and breathing factors, as well as the cardiorespiratory system control processes based on the variability rate of physiological parameters, and (3) the interconnection between the cardiorespiratory system during a long-duration mission and the tolerance of orthostatic & physical activities at the beginning of readaptation for predicting possible reactions of the crewmembers organism during the their return to ground.]*

CDR Sturckow and FE-2 Williams terminated the N<sub>2</sub> (nitrogen) transfer between Shuttle and the ISS HPT (high-pressure tank) on the U.S. Airlock (A/L) exterior. The originally planned transfer of O<sub>2</sub> (oxygen) has been deferred from Flight Day 7 (FD7) to FD9, to support an option of an extra Shuttle docked day.

Sunita Williams and Clayton Anderson worked in the A/L on preparations for tomorrow's EVA-3 by Jim Reilly (EV1) and Danny Olivas (EV2), verifying good water recharge for EMU #3010 (EV1) and EMU #3004 (EV2). *[During EVA-2 yesterday, Forrester's EMU used more water than expected.]*

Earlier, Suni turned around the two DCS 760 cameras to ready them for the spacewalk.

Also for EVA-3, Anderson started EMU battery charge in the BSA (Battery Stowage Assembly), and Kotov terminated the regeneration of METOX (Metal Oxide) CO<sub>2</sub> absorption canisters in the "bakeout" oven.

Forrester, Olivas and Reilly tagged up on the planned spacewalk tomorrow for a joint review and discussion of procedures, then collected the EVA tools required,

and configured their EMUs, installing METOX cans and setting up the A/L Crewlock (CL) for tonight's campout.

Reilly and Olivas had about an hour set aside on their timeline for practicing the OMS Pod blanket repair using Shuttle seat headrests to simulate blanket material and rehearse stapling and pin insertion. Also, Clay Anderson set up the OGS H<sub>2</sub> vent valve assembly, slated for installation during EVA-3, for leak checking. A final EVA-3 procedures review for all crewmembers is scheduled for ~8:25pm EDT tonight. Afterwards, mask prebreathe for JR and Danny will begin at ~11:00pm, with subsequent campout depressurization of the A/L CL to 10.2 psi for their sleep period. ***[EVA-3 planning see below.]***

Clay undertook the standard monthly PEP (portable emergency provisions) safety inspection, his first. *[The IMS-supported 30-min inspection involved verification that PFEs (portable fire extinguishers) and PBAs (portable breathing apparatus) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware. Inspection of QDMAs (quick-don mask assemblies) was not required today. With masks and bottles temporarily moved to the A/L for the EVA, Clay inspected a total of four bottles and four masks in the A/L to support campout.]*

Sunita worked with Clay on packing procedures for the science samples of TROPI (Study of Novel Sensory Mechanism in Root Phototropism) and CARD (Investigation of Mechanisms of Heart Disease with New Portable Equipment), currently in cold storage in the MELFI, into DCB (Double Coldbag) for return on the Shuttle. *[During the transfer, the samples cannot be exposed to ambient air for more than a few minutes, - three minutes in the case of TROPI, or loss of science will occur.]*

Anderson deployed the new TEPC (Tissue Equivalent Proportional Counter) radiation measurement equipment, followed by its activation and checkout.

Clay also broke out two newly delivered CSA-CP (Compound Specific Analyzer-Combustion Products) units (#1015, #1016), changed out their batteries, verified that the sensors are not contaminated and zero-calibrated them for use on ISS. *[Currently in use are CSA-CP #1051 (prime) and #1044 (backup).]*

Kotov conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), Oleg also updated/edited its standard "delta file", including locations, for the regular weekly automated export/

import to its three databases on the ground (Houston, Moscow, Baikonur).

FE-2-15 Anderson spent study time on an overview of CMS (Crew Medical Systems) equipment aboard the station. *[The review covered identification, stowage location and explanatory notes of physical exercise accessories, exercise prescriptions, and detailed instructions for using the TVIS treadmill, RED resistive exerciser, CEVIS cycle ergometer, and HRM heart rate monitor.]*

The ISS crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-1), TVIS treadmill (FE-2), and RED resistive exerciser (CDR, FE-1). Williams is on a reduced protocol.

The exercise data files were transferred later by Suni and Clay to the MEC (Medical Equipment Computer), as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week). Anderson also prepared the MEC with new Expedition 15 HRM software, personalized for him as new FE-2.

At ~11:25am, CDR Yurchikhin conducted an amateur radio session with youngsters at the 6<sup>th</sup> International Camp Slavic Fellowship, currently taking place at Sochi with students, scientists, professors and regional administrators from the Russian Federation, Belorussia, Ukraine, Bulgaria, Serbia, and Montenegro.

At ~9:58pm, the STS-117 flight crew is scheduled for three PAO TV interview exchanges, one with Fox News Radio (Holly Hickman), the second with KMGH-TV, Denver (Anne Trujillo), and the third with KUSA-TV in Denver (Bob Kendrick).

***Russian Computer Systems Update:*** The Russian TVM (Terminal Computer) and TsVM (Central Computer) systems in the SM, each triple-redundant, have not yet been successfully restarted. The situation is dynamic, with restarts and subsequent failures throughout the night and morning. Troubleshooting telemetry is hampered by limited comm windows over RGS (Russian ground sites). Russian specialists, working closely with U.S. teams, have been concentrating on troubleshooting and restoring computer capability which is critical for attitude control, Elektron and Vozdukh operation, state vector updates for U.S. GNC MDMs, external SM thermal loops, and power transfers from the USOS to the RS. NASA teams at JSC are focusing on four issue areas: (1) TVM/TsVM computer root cause analysis, (2) docked mission impacts, (3) attitude control modeling and Orbiter prop usage, and (4) attitude control without Russian computers.

***EVA-2 Update:*** When the SARJ DLA-1 (Solar Alpha Rotary Joint/Drive Lock Assembly 1) was deployed last night during the spacewalk, the EDM (Engage/

Disengage Motor) was in a “drive” position when it should have been in “neutral”. This caused the EDM to experience a pinion gear interference with the race ring, preventing the desired alignment/engagement until the EDM was commanded to neutral. This was executed by ground commanding while the EVA crew manually grasped the motor housing to keep the drive arm free of the race ring, allowing subsequent successful deployment of the DLA. With DLA-1 confirmed engaged, all 16 launch locks were removed, and 3 of 6 launch restraints have been torque-relieved. Reason: Near the end of EVA-2, it was realized that commanding for DLAs 1 & 2 is swapped, i.e., DLA-1 commands go to DLA-2 and vice versa. DLA-2 needs to be reconfigured during the next spacewalk or EVA-4.

**EVA-3 Planning:** The replanned EVA-3 tomorrow will focus on the repair of the thermal protection blanket on the left OMS Pod by Danny Olivas on the SRMS, and on the R&R (removal & replacement) of the H<sub>2</sub>O/H<sub>2</sub> vent valve for the new OGS (Oxygen Generation System) by Jim Reilly. Additional time is allotted for the spacewalkers to assist with 2B retraction as required, and for removing the remaining SARJ launch restraints, stowing the S3 drag link/keel pin and closeout ops. For the OMS Pod blanket repair, the final plan has four parts:

1. Patting down the damaged blanket and the lifted leading edge of the adjacent blanket,
2. Stapling the damaged blanket to the adjacent blanket using an IV medical stapler,
3. Pinning the damaged blanket to white tiles using heat-resistant Tile Overlay NiC (Nickel-Carbon) pins, and
4. Pinning the adjacent blanket also to white tiles.]

No CEO (Crew Earth Observation) photo targets uplinked for today. There are no CEO targets during the current joint ops period due to unfavorable lighting conditions and task loading.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:15am EDT [= epoch]):

Mean altitude -- 335.7 km

Apogee height -- 340.9 km

Perigee height -- 330.5 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007736  
Solar Beta Angle -- 42.4 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in the last 48 hours -- 71 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 49034

**Significant Events Ahead** (*all dates Eastern and subject to change*):

06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)  
06/17/07 -- EVA-4  
06/19/07 -- STS-117/Atlantis/13A undocking  
06/21/07 -- STS-117/Atlantis/13A KSC landing (~1:54pm EDT)  
07/13/07 -- FGB solar array retraction  
07/13/07 -- ESA ships ATV to Kourou/French Guyana  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks [*under review*]  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking (SM aft port)  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch [*to be reviewed*]  
12/13/07 -- (NET) STS-122 undocking

12/14/07 -- Progress M-62/27P docking  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/13/07  
**Date:** Wednesday, June 13, 2007 9:53:52 PM  
**Attachments:**

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**ISS On-Orbit Status 06/13/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 6 for STS-117; Day 4 of Joint Ops. Day 186 in space & Day 184 on ISS for Suni (launched 12/9/06 on STS-116),*

**Initial retraction of the 2B SAW (solar array wing) of the P6 truss was accomplished as planned. All EVA-2 objectives today were achieved, except for release of one last SARJ launch lock.**

EVA-2, by Pat Forrester (EV3) and Steve Swanson (EV4), began at 2:28pm EDT, 20 min behind schedule, and ended at 9:44pm, lasting 7h 16m. It was the 85<sup>th</sup> spacewalk for ISS assembly & maintenance, the 57<sup>th</sup> from the station (28 from Shuttle, 22 from Pirs), the third for Forrester, and the first for Swanson. After today's spacewalk, a total of 91 spacewalkers (64 NASA astronauts, 19 Russians, and eight astronauts representing Japan-1, Canada-2, France-1, Germany-1 and Sweden-3) have logged a total of 522h 36m outside the station on building, outfitting and servicing. It also was the 107<sup>th</sup> spacewalk by U.S. astronauts.

*[During EVA-2, Forrester and Swanson –*

- Supported partial SAW 2B retraction (at ~4:50pm, they turned to other EVA tasks, with 18.5 bays (of 31.5), or 67.5 ft (of 115 ft total) remaining unretracted; more retraction activities are planned for tomorrow without an EVA crew present),*
- Deployed four bracing beams to rigidizing the SARJ (Solar Alpha Rotary Joint) by ~6:00pm,*
- Installed SARJ DLA 1 (Drive Lock Assembly #1) and verified DLA pinion gear teeth fully engaged with SARJ race ring teeth (with correct wiring of DLA 1 & DLA 2 still to be verified, requiring one launch lock to remain in place),*

- *Removed all SARJ launch locks/launch restraints except one (~8:52pm), and*
- *Cleaned up and inventoried EVA equipment before ingressing.]*

After crew wakeup at 9:10am EDT, the ten station occupants again worked a very busy schedule. *[Sleep time tonight: 12:00am (ISS), 12:40am (STS).]*

Before breakfast, CDR Yurchikhin & FE-1 Kotov performed the Russian biomedical routine assessments of PZEH-MO-7/Calf Volume Measurement and PZEH-MO-8/ Body Mass Measurement (3<sup>rd</sup> time for both), using the IM mass measurement device which Kotov afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

The crew supported 2B SAW partial retraction, with CJ Sturckow & JR Reilly handling the bay-by-bay retraction and Lee Archambault working with the SSRMS (Space Station Remote Manipulator System) for proper arm camera positioning to verify the mast retractions. *[To facilitate the viewing, last night the MT (Mobile Transporter) cart with the SSRMS based on it was rolled on its rails from WS-2 (Worksite 2) to WS-3. Because of problems with the retraction of the left-side P6 SAW 4B during Mission 12A.1, a slower approach was selected this time, i.e., starting retraction well before the spacewalk and proceeding bay-by-bay with intermittent "wiggling". Ground-controlled retraction began at 6:47am, and CJ & JR took over at 10:42am.]*

Before spacewalk begin, the Crewlock (CL) hatch was cracked (~10:00am) for a hygiene break with mask prebreathe for Forrester and Swanson, after they spent the night on 10.2 psi campout. At ~10:50am, the hatch was closed again for resumption of depress at 10.2. *[Pat & Swanny were joined in isolation by Olivas & Williams to assist with EMU purging/prebreathe and CL depressurization.]*

As part of EVA preps, CDR Yurchikhin verified onboard ham radio equipment powerdown (Kenwood in SM & Ericsson in FGB) to prevent RF interference with the EMUs.

Later, Yurchikhin again spent time on post-Orlan EVA (#18 & #19) cleanup,

reconfiguring the DC1 (Docking Compartment) and SM PkhO (Service Module Transfer Compartment) to initial pre-EVA condition.

The CDR also worked on recharging the DCS 760 camera batteries, to be used on Friday's EVA-3.

After EV1/EV2 ingress at 9:44pm, Sunita Williams supported post-EVA closeout ops in the "Quest" Airlock (A/L) by starting recharge of the EMU batteries in the BSA (Battery Stowage Assembly) as well as regenerating used METOX (Metal Oxide) canisters in the A/L "bakeout" oven.

Oleg Kotov spent about one hour of "handover" time with Clay Anderson, the new station FE-2. *[All three ISS crewmembers have time scheduled for handovers with Clay. Primary tasks to be worked during these activity blocks are listed in a special digital Handover book in the IPV (International Procedures Viewer).]*

Afterwards, Clay and Oleg had almost eight hours scheduled between them for Shuttle transfers. Cargo transfers during the docked period involve –

- From Atlantis to ISS: ~725 lbs of internal dry cargo (27 ft<sup>3</sup> in middeck) *[including science support equipment, medical equipment, EVA support gear, camera equipment, laptop computers, TEPC (Tissue Equivalent Proportional Counter) assembly, and atmospheric monitors (CSA-O2, CSA-CP); ~1235 lb or 559 L of water (13 CWCs @43L or 95 lb each); ~40 lbs (up to 100 lbs) of oxygen as margins permit];*
- From ISS to Shuttle: ~900 lbs of internal dry cargo (33 ft<sup>3</sup> in middeck), *[i.e., components for failure analysis (SCU, TEPC), completed samples of science experiments, air/water samples, internal coolant sample, miscellaneous trash, life-expired components, etc.]*

Kotov, with Anderson assisting for "handover" familiarization, initiated (and later terminated) the periodic task of transferring accumulated water from the Lab condensate collection tank to a CWC (Contingency Water Container), using an FSS (Fluid System Servicer) jumper hose.

Clay Anderson had a "free" hour set aside on his timeline for ISS familiarization & adaptation, to help in adjusting to his new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

FE-1 Oleg Kotov took his first CHeCS CMO (Crew Health Care Systems/Crew Medical Officer) on-board training drill, a 30-min. video & audio refresher course to hone the CMO's acuity in applying ACLS (advanced cardio life support) etc. in an emergency. *[The HMS (Health Maintenance Systems) hardware, including ACLS*

*equipment, may be used in contingency situations where crew life is at risk. Also included in the program are such tasks as nosebleed treatment and laceration closure. To maintain proficiency, crewmembers spend one hour per month reviewing HMS and ACLS equipment and procedures via the HMS and ACLS CBT (computer-based training). The training drill, each crewmember separately, refreshes their memory of the on-orbit stowage and deployment locations, equipment etc. and procedures.]*

Later, Kotov performed the regular monthly TVIS (Treadmill with Vibration Isolation & Stabilization) maintenance, inspecting the condition of harnesses, belt slats, corner bracket ropes, IRBAs (Isolation Restorative Bungee Assemblies) and gyroscope wire ropes for any damage or defects, lubricating as required plus recording time & date values.

Afterwards, Oleg retrieved and stowed the two FMKs (Formaldehyde Monitoring Kits) deployed by Fyodor on 6/11 in the Lab (below CEVIS cycle) and SM (most forward handrail).

Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), the CDR updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The ISS crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (CDR) and VELO bike with bungee cord load trainer (FE-1).

The exercise data files were transferred later by Suni to the MEC (Medical Equipment Computer), as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Later tonight, Yurchikhin will downlink photos of today's EVA-2.

*Nitrogen Transfer:* GN<sub>2</sub> (gaseous nitrogen) transfer from the Shuttle to the HPT (high-pressure tank) on the "Quest" A/L continues. Transfer of about 40 lbs of O<sub>2</sub> (oxygen) is planned for tomorrow but may be cancelled if current assessment shows that the O<sub>2</sub> may be better used in support of an additional "weather-waveoff"

day.

*SM Computer Issues:* Both the Russian TVM (Terminal Computer System) and TsVM (Central Computer) systems in the SM are now operating again, each with one of its three redundant subsets working. Yesterday, the computers suffered several restart attempts, losing the RS SUDN (Motion Control System, MCS) for about 5 hrs. By ~8:00pm EDT last night, TVM and TsVM were back up and stabilized with one lane operating each. A full restart of both computer systems is scheduled for tomorrow, at about 10:00am. Meanwhile, specialists are assessing what happened.

*Elektron and Vozdukh:* Elektron (O<sub>2</sub> generator) and Vozdukh (CO<sub>2</sub> scrubber) are powered off and will be restarted after SM computer restart tomorrow. O<sub>2</sub> and CO<sub>2</sub> levels are being closely monitored and are well within acceptable Partial Pressure (or concentration) bands.

*Attitude Control Issues:* At the failure of the Russian TVM and SUDN yesterday at approximately 5:25pm EDT, attitude control (A/C) of the Shuttle/Station stack went to the Shuttle Orbiter, using its VRCS (Vernier Reaction Control System). As a result of this configuration, the ISS photovoltaic SAWs were no longer allowed to autotrack the sun (to avoid contamination erosion & pluming loads on the arrays), which soon resulted in C&W (Caution & Warning) alarms for low 2A/4A battery charge levels. Ground controllers were able to manage the arrays and power loads until the TVM was re-enabled. Later (~7:42pm), during A/C handover from the Orbiter directly to U.S. CMG MM (Control Moment Gyroscope Momentum Management), the CMG momentum levels quickly saturated and the mated stack experienced a LOAC (Loss of Attitude Control). A/C immediately reverted to Shuttle VRCS while Russian computers were restarted/reinitialized. A/C was then handed over in sequence from the Orbiter VRCS to USTO (US Thrusters Only) to CMG MM, regaining full control at approximately 9:00pm. At 9:50pm, the CMGs again saturated due to high momentum levels, and the stack experienced a second LOAC, putting VRCS back in control. The mated stack was later allowed to go into free drift for the MT translation activities, as per nominal plan, which simultaneously provided an opportunity to allow the SAWs to autotrack and charge batteries. CMG MM was successfully regained at approximately 1:20am this morning and is now in good condition (momentum loading ~23%). Prop usage on the Orbiter (forward RCS) is about seven times higher than predicted by preflight models.

*PVCU MDM Issue:* After some troubleshooting, both new PVCU MDMs (Photovoltaic Controller Unit/Multiplexer-Demultiplexer computers), 1A & 3A, were determined to be fully functional, although communication cannot be established with both controllers at the same time without executing some additional manual commands via the primary & backup PMCU (Power Management Controller)

MDMs. Specialists are investigating the root cause which appears to be a software issue.

No CEO (Crew Earth Observation) photo targets uplinked for today. There are no CEO targets during the current joint ops period due to unfavorable lighting conditions and task loading.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:55am EDT [= epoch]*):

Mean altitude -- 335.8 km

Apogee height -- 341.3 km

Perigee height -- 330.2 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008197

Solar Beta Angle -- 47.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude gain in the last 48 hours -- 770 m (*due to Shuttle thrusting*)

Revolutions since FGB/Zarya launch (Nov. 98) -- 49018

**Significant Events Ahead** (*all dates Eastern and subject to change*):

06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)

06/17/07 -- EVA-4

06/19/07 -- STS-117/Atlantis/13A undocking

06/21/07 -- STS-117/Atlantis/13A KSC landing (~1:54pm EDT)

07/13/07 -- FGB solar array retraction

07/13/07 -- ESA ships ATV to Kourou/French Guyana

07/20/07 -- US EVA-9

07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/05/07 -- Progress M-59/24P undocking (DC1) & reentry

08/06/07 -- Progress M-61/26P launch

08/08/07 -- Progress M-61/26P docking (DC1)

08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking

08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking

08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing

08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking (SM aft port)  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/12/07  
**Date:** Tuesday, June 12, 2007 3:56:03 PM  
**Attachments:**

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**ISS On-Orbit Status 06/12/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 5 for STS-117; Day 3 of Joint Ops. Day 185 in space for Suni (launched 12/9/06 on STS-116), Day 183 on ISS. Russia's National Holiday of Independence Day.*

**Both new SAWs (Solar Array Wings), 1A & 3A, are fully deployed from the S4 truss,- 38 ft/11.6 m wide and spanning 240 ft/73 m tip-to-tip.**

After crew wakeup at 9:10am EDT, the ten station occupants again worked a very busy schedule. *[Sleep time tonight: 12:38am (ISS), 1:08am (STS).]*

The crew supported 1A & 3A SAW deployment, with Sunita Williams & Pat Forrester working with the SSRMS (Space Station Remote Manipulator System) for proper arm camera positioning to verify the mast extensions. *[To allow thermal conditioning of the unfolding panels, each wing was deployed in three steps: one bay (last night), then 49% (15.5 cell bays), finally 100% (31.5 bays).]*

CDR Yurchikhin, assisted by FE-1 Kotov, completed post-EVA-19 cleanup activities, by –

Terminating the discharge/recharge cycle on the second 825M3 Orlan battery pack in the DC1 (Docking Compartment) for discharge, then removing the pack from the charger, and

Reconfiguring the DC1 (Docking Compartment) and SM PkhO (Service Module Transfer Compartment) to initial pre-EVA condition.

Yurchikhin also restored the IMV (inter-modular ventilation) air exchange system between the FGB and the Soyuz TM-10/14S to pre-EVA configuration. *[This involved disconnecting the BVN fan/heater assembly and repositioning it, rerouting an end of the air duct, repositioning a blower unit, readjusting its grounding strap,*

*etc.]*

Starting preparations for Friday's EVA-3, Oleg Kotov worked with FE-2-15 Clay Anderson on recharging the EMU batteries in the BSA (Battery Stowage Assembly) in the "Quest" Airlock (A/L).

For EVA-2, FE-2 Williams configured the SSC-10 (Station Support Computer 10) with an RF network card and installed the A31p laptop with its power supply equipment in the A/L.

Afterwards, Sunita terminated the regeneration of the METOX (Metal Oxide) canisters initiated yesterday after EVA-1.

Fyodor reconfigured the two DCS 760 digital cameras using during EVA-1, turning them around and readying them for EVA-2.

Oleg Kotov & Pat Forrester set up the GN<sub>2</sub> (gaseous nitrogen) flexhose assembly for transferring N<sub>2</sub> from the Shuttle tankage to the HPT (high-pressure tank) on the "Quest" A/L, then started the transfer (by equalization, i.e., no pump).

Clay Anderson had his first session with the PMDIS (Perceptual Motor Deficits in Space) experiment, setting it up, installing the hardware and conducting the first data collection. Results were then be copied to CD and the equipment stowed for the next run. *[PMDIS investigates why Shuttle astronauts experience difficulty with hand-eye coordination while on orbit. PMDIS will attempt to distinguish between the three current theories for this initial decline in hand-eye coordination in space {the current explanations are as follows: The brain isn't adapting to the weightlessness of space; the difficulty of performing fine movements when floating in space; and stress due to factors such as space sickness and sleep deprivation}. PMDIS first measures the Shuttle astronaut's hand-eye coordination prior to docking with ISS (transition from 1-g to zero-g). Measurements are taken while the astronaut's arm is securely supported or floating free in three conditions: Tapping targets on a computer screen with a stylus and moving a cursor between the targets with a joystick, performing these tasks while responding to tones presented via earphones with a button press. The experiment will test the theory that the loss of eye-hand coordination during spaceflight is due to the disruption of certain neural circuits in the human brain, arising from a disruption in the vestibular system.]*

Clay also performed his second status checkup & filter inspection of the running CSI-4/5 (CGBA Science Insert 4/5) payload of seed germination modules and nematode worms housed in the CGBA (Commercial Generic Bioprocessing Apparatus) incubator. *[The incubator is controlled from the ground with automatic*

*video downlinked to Earth. Students in the U.S. and Malaysia are participating in educational activities in their classrooms while monitoring the growth in orbit.]*

FE-2 Williams undertook her eighth and last run with the NASA-sponsored German/Canadian experiment TRAC (Test of Reaction & Adaptation Capabilities). After setting up the video gear and assembling the TRAC hardware in the work area (i.e., laptop, joystick, headphones, and time box), Suni performed her data take session, later closing out and stowing the equipment. (Done last: 4/13), *[TRAC tests the idea that the decrease in motor skills reported by some astronauts (for example, hand-eye coordination), is due to the brain adapting to being in space. By testing hand/eye coordination of crewmembers, scientists hope to test the theory that while the brain is adapting its sensory-motor functions to space it is unable to fully provide the resources necessary to perform normal manual skills, i.e., the data will be used to show that adaptation to zero-G draws on resources normally used for computational tasks, for example. Crewmembers test their hand-eye coordination prior to the mission, while on orbit and then again when they have returned to Earth. TRAC hardware includes a laptop mounted to a table and a joystick to control the cursor on the PC screen. Also used are audio headphones and a reaction time box to respond to audio and visual stimuli. For the test the crewmember is sitting on the floor of the Lab module, with legs restrained and the work table on the legs.]*

Sunita supported a controlled power-down of the VOA (Volatile Organics Analyzer), with its RPC (remote power controller) power-cycled from the ground.

Williams had ~2.5 hrs of “handover” time with Anderson, her replacement FE. *[All three ISS crewmembers have time scheduled for handovers with Clay. Primary tasks to be worked during these activity blocks are listed in a special digital Handover book in the IPV (International Procedures Viewer). Since Suni, officially now a member of the Shuttle crew, continues to live on the station, she is still scheduled as an ISS crewmember until a day before departure.]*

Afterwards, Anderson spent about two hours on Shuttle transfers. Cargo transfers during the docked period involve –

- From Atlantis to ISS: ~725 lbs of internal dry cargo (27 ft<sup>3</sup> in middeck) *[including science support equipment, medical equipment, EVA support gear, camera equipment, laptop computers, TEPC (Tissue Equivalent Proportional Counter) assembly, and atmospheric monitors (CSA-O2, CSA-CP); ~1235 lb or 559 L of water (13 CWCs @43L or 95 lb each); ~40 lbs (up to 100 lbs) of oxygen as margins permit];*
- From ISS to Shuttle: ~900 lbs of internal dry cargo (33 ft<sup>3</sup> in middeck), *[i.e., components for failure analysis (SCU, TEPC), completed samples of science experiments, air/water samples, internal coolant sample,*

*miscellaneous trash and life-expired components, etc.]*

Fyodor conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables. In addition, the CDR transferred condensate from CWC (Contingency Water Container) to EDV container via filtration and handled the regular processing (“regenerating”) of KAV condensate water in the Russian water processing system (SRV-K2M) using the electric condensate pumping unit (BPK).

Working on the IMS (Inventory Management System), Yurchikhin updated/edited its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

As yesterday, Clay Anderson had about two hours on his timeline set aside for ISS familiarization & adaptation, to help in adjusting to his new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

Getting ready for tomorrow’s EVA-2, the two designated spacewalkers, Pat Forrester (EV3) & Steve Swanson (EV4), along with Yurchikhin and Kotov, reviewed procedures and timeline for the excursion.

At 10:40pm, the ground commanded translation of the MT (Mobile Transporter) from Worksite 2 (WS-2) to WS-3.

Afterwards, the “Campout” by Shuttle Mission Specialists Pat Forrester and Steve Swanson in the A/L Crewlock (CL) began with mask prebreathe and tool configuration at ~12:18pm, with hatches closed and depressurization of the CL initiated from 14.7 to 10.2 psi for their 8.5-hr sleep time.

*SM Computer Loss of Redundancy:* During EVA-1, on Daily Orbit 5 (DO5), two anomalies occurred for the Russian SM computers: The TVM (Terminal Computer System) lost subset 3 of its three redundant lanes, and the TsVM (Central Computer), which has been operating on only two of its three sets, lost lane 2 when it was voted out of the set. This leaves two functioning channels on TVM and one channel on TsVM (i.e., no redundancy). As specialists at Energia are assessing, the plan is to restart/reinitialize TsVM on 6/14.

*PVCU MDM 1 loss:* Troubleshooting is underway for the PVCU photovoltaic controller computer MDM-1A for Channel 1A, which did not respond to commands during power channel activation last night. The other computer, PMCU MDM-3A, is operating nominally and controlling the 1A and 3A power channels. An investigation is in progress to discuss future troubleshooting and impacts.

*IWIS: IWIS (Internal Wireless Instrumentation System) equipment was not torn down as scheduled, due to the postponement of the Russian Thruster Firing Test DTO (Development Test Objective). [The structural dynamics data take planned for the DTO, including with an RSU (Remote Sensor Unit) installed in the Shuttle airlock, are awaiting the DTO (perhaps next Saturday/Sunday) and yesterday only captured the S3/S4 berthing.]*

No CEO (Crew Earth Observation) photo targets uplinked for today There will be no CEO targets for the upcoming joint ops period due to unfavorable lighting conditions and task loading.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

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**ISS Orbit** (*as of this morning, 6:35am EDT [= epoch]*):

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Apogee height -- 340.3 km

Perigee height -- 329.7 km

Period -- 91.23 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007933

Solar Beta Angle -- 53.0 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 150 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 49002

**Significant Events Ahead** (*all dates Eastern and subject to change*):

06/13/07 -- EVA-2 (~2:03pm, 6.5 hrs)

06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)

06/17/07 -- EVA-4 **[added]**

06/19/07 -- STS-117/Atlantis/13A undocking **[new]**

06/21/07 -- STS-117/Atlantis/13A KSC landing (~1:54pm EDT) **[new]**

07/13/07 -- FGB solar array retraction

07/13/07 -- ESA ships ATV to Kourou/French Guyana

07/20/07 -- US EVA-9

07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/05/07 -- Progress M-59/24P undocking (DC1) & reentry

08/06/07 -- Progress M-61/26P launch

08/08/07 -- Progress M-61/26P docking (DC1)

08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks *[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking (SM aft port)  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 06/11/07

**Date:** Monday, June 11, 2007 10:30:05 PM

**Attachments:**

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**ISS On-Orbit Status 06/11/07**

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 4 for STS-117; Day 2 of Joint Ops. Day 184 in space for Suni (launched 12/9/06 on STS-116), Day 182 on ISS. Underway: Week 8 of Increment 15.*

**S3/S4 truss installation on the S1 truss was nominal, with no issues. Total ISS mass now: 509,000 lbs.** All EVA-1 objectives were accomplished ahead of schedule, plus one get-ahead task.

Truss installation and EVA-1 were delayed by about an hour because of loss of CMG (Control Moment Gyroscope) attitude control due to momentum saturation of the gyros. Control was regained by using the Shuttle verniers (small thrusters) for CMG desaturation.

After crew wakeup at 9:10am EDT, the ten station occupants today worked a very busy schedule, as they did on FD3 yesterday.

Last night, grappling of the starboard-3 & -4 (S3/S4) truss segments with a new set of solar arrays by the SRMS (Shuttle Remote Manipulator System), transfer of the 36,000 lbs mass out of the Atlantis payload bay to the ISS and its "handover" to the SSRMS (Space Station Remote Manipulator System) went smoothly and on time, completed at ~8:30pm EDT. The S3/S4 was "parked" overnight at the SSRMS end effector, until its installation today. *[S3 contains the SASS (Segment to Segment Attach System), SARJ (Solar Alpha Rotary Joint), PAS (Payload Attach Systems), and an MT (Mobile Transport) worksite. S4 contains the 1A & 3A SAWs (Solar Array Wings), PVR (Photovoltaic Radiator), and RTAS (Rocketdyne Truss Attachment System).]*

In addition to the S3/S4 elements, cargo transfers during the next days will be –

- From Atlantis to ISS: ~725 lbs of internal dry cargo (27 ft<sup>3</sup> in middeck) [*including science support equipment, medical equipment, EVA support gear, camera equipment, laptop computers, TEPC (Tissue Equivalent Proportional Counter) assembly, and atmospheric monitors (CSA-O2, CSA-CP); ~1235 lb or 559 L of water (13 CWCs @43L or 95 lb each); ~40 lbs (up to 100 lbs) of oxygen as margins permit*];
- From ISS to Shuttle: ~900 lbs of internal dry cargo (33 ft<sup>3</sup> in middeck), [*i.e., components for failure analysis (SCU, TEPC), completed samples of science experiments, air/water samples, internal coolant sample, miscellaneous trash and life-expired components, etc.*]

Also, two EMU (Extravehicular Mobility Unit) outfits were brought over from the Shuttle to the “Quest” Airlock (A/L). Afterwards, the “campout” by Shuttle Mission Specialists Jim Reilly (EV1) and Danny Olivas (EV2) in the A/L Crewlock (CL) began with mask prebreathe at ~11:23pm, then closing hatches and initiating depressurization of the CL from 14.7 to 10.2 psi at ~1:10am for their 8.5-hr sleep time.

Before spacewalk begin, at ~11:15am EDT, the CL hatch was cracked for a hygiene break/with mask prebreathe for Reilly and Olivas, after spending the night on 10.2 psi campout. At ~11:30am, the hatch was closed again for continued depress period at 10.2. [*JR and Danny were joined in isolation by Swanson and Williams to assist with EMU purging/prebreathe and CL depressurization.*]

Prior to EV1/EV2 egress from the CL, Archambault & Kotov, supported by Forrester with the RWS AVU (Robotics Workstation Artificial Vision Unit), maneuvered the SSRMS with the S3/S4 truss assembly to the ready-to-latch position at the S1 truss and completed first, second and third stage capture of the S3 by the S1 SSAS (Segment-to-Segment Attachment System), with the SSRMS switched to “limp” mode. Clay Anderson performed the SSAS bolting. The SSRMS was ungrappled from the truss at 3:21pm and maneuvered to allow ground viewing of SABBs (Solar Array Blanket Boxes) pin unlatching/relatching. All four SSAS bolts were correctly driven home by ~3:38pm. Afterwards, Archambault also cleaned up and deactivated the AVU.

EVA-1 begun at 4:02pm, about an hour behind timeline, but quickly made up for the delay by getting ahead one hour, ending at 10:17pm, with a total duration of 6h 15m. Post-EVA power-ups showed all truss connections working properly. It was the 84<sup>th</sup> spacewalk for ISS assembly & maintenance, the 56<sup>th</sup> from the station (28 from Shuttle, 22 from Pirs), the fourth for Reilly and the first for Olivas. After today's spacewalk, a total of 89 spacewalkers (62 NASA astronauts, 19 Russians & eight astronauts representing Japan-1, Canada-2, France-1, Germany-1 and Sweden-3) have logged a total of 515h 20m outside the station on building, outfitting and

servicing. *[During today's spacewalk, Reilly and Olivas -*

- *Connected lower & upper tray umbilicals for S3/S4 survival power (internal "keep alive" heaters until the new solar arrays are deployed tomorrow), data and video,*
- *Released launch restraint pins (seven each) on the four SABBs (Solar Array Blanket Boxes),*
- *Released forward & aft BGA (Beta Gimbal Assembly) restraints,*
- *Unstowed forward & aft SABBs,*
- *Removed & jettisoned thermal shrouds following S4 activation,*
- *Removed launch locks and engaged drive lock assemblies for SARJ (Solar Alpha Rotary Joint) rotation and sun tracking,*
- *Installed four rigidizing AJIS (Alpha Joint Interface Structure) struts,*
- *Prepared & monitored deployment, at 8:40pm, of the S4 PVR (Photovoltaic Radiator) and*
- *Removed a no-longer-needed SVS (Space Vision System) target plate (get-ahead task).]*

Aboard the station, the ISS crew of CDR Yurchikhin, FE-1 Kotov and FE-2 Williams spent much of their time supporting the Shuttle crew.

During the S3/S4 installation, Kotov assisted Archambault with SSRMS ops, then worked with FE-2 Anderson on cleaning up after the RS Orlan EVA-19 (of 6/6) by leak checking and drying the Sokol spacesuits.

Suni Williams assisted the spacewalkers during camp-out with EVA preparations, EMU purging, prebreathing and CL depressurization. Suni and Swanny also provided post-EVA assistance to the spacewalkers, including initiation of METOX (Metal Oxide) canister regeneration in the A/L.

At the beginning of EVA-1 viewing, Sunita supported Bru Archambault with SSRMS Ops.

Later, she had 1.5 hrs of "handover" time with her replacement, Clay Anderson. *[All three ISS crewmembers have time scheduled for handovers with Clay. Primary tasks to be worked during these activity blocks are listed in a special digital Handover book in the IPV (International Procedures Viewer). Since Suni, officially now a member of the Shuttle crew, continues to live on the station, she is still scheduled as an ISS crewmember until a day before departure.]*

After verifying onboard ham radio equipment powerdown (Kenwood in SM & Ericsson in FGB) to prevent RF interference with the EMUs, CDR Yurchikhin spent time on post-EVA-19 cleanup, stowing Orlan & tool equipment and setting up the first 825M3 Orlan battery pack in the DC1 (Docking Compartment) for discharge,

then starting the cycle. The discharge was terminated shortly before sleep time and initiated on the second battery pack.

Later, Yurchikhin completed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with purified water from CWC (Contingency Water Container) collected by the U.S. CCAA (Common Cabin Air Assembly). *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron micropump shutdown.]*

Fyodor also conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables. Today, this included the regular processing ("regenerating") of KAV condensate water using the electric condensate pumping unit (BPK) of the Russian water processing system (SRV-K2M) behind SM wall panels and US Lab-collected & filtered water in CWCs.

Following yesterday's air sampling with the Russian AK-1M adsorber by Kotov, Yurchikhin today collected air samples at the center of the Lab and SM with the GSC (Grab Sample Container) for return to Earth.

Afterwards, the CDR performed the periodic deployment of two passive FMK (formaldehyde monitoring kit) sampling assemblies in the Lab (below CEVIS) and SM (most forward handrail), to catch any atmospheric formaldehyde on a collector substrate for subsequent analysis on the ground.

Working on the IMS (Inventory Management System), Fyodor updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Later, the CDR started charging of the DCS 760 camera batteries used yesterday for the RPM photo shoot. Close to sleeping time, he downlinked photos of today's EVA-1.

Clay Anderson performed his first payload activities of his "tenure" on ISS, starting with the SLEEP (Sleep-Wake Actigraphy and Light Exposure during Spaceflight) experiment, for which he donned his Actiwatch, initialized by Suni on 5/24. *[Data collection was previously configured to begin on 6/9, and an Actiwatch download will be scheduled in a few weeks.]*

Clay also performed his first status checkup and filter inspection of the running CSI-4/5 (CGBA Science Insert 4/5) payload of seed germination modules and nematode worms housed in the CGBA (Commercial Generic Bioprocessing Apparatus)

incubator. *[The incubator is controlled from the ground with automatic video downlinked to Earth. Students in the U.S. and Malaysia are participating in educational activities in their classrooms while monitoring the growth in orbit.]*

Energia/Moscow has requested postponement of the scheduled Thruster Firing Test DTO (Development Test Objective) to allow more time for ground testing. *[The IWIS (Internal Wireless Instrumentation System) structural dynamics data take planned for the DTO, including with an RSU (Remote Sensor Unit) installed in the Shuttle airlock, will be postponed accordingly (perhaps to next Saturday/Sunday) and today only captured the S3/S4 berthing.]*

The ISS crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-1, FE-2), TVIS treadmill (CDR, FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1). *[No exercise allowed on ISS or Shuttle during specific installation/deployment/EVA stages.]*

No CEO (Crew Earth Observation) photo targets uplinked for today. There will be no CEO targets for the upcoming joint ops period due to unfavorable lighting conditions and task loading.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 7:49am EDT [= epoch]):*

Mean altitude -- 335.1 km

Apogee height -- 340.3 km

Perigee height -- 329.9 km

Period -- 91.23 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007721

Solar Beta Angle -- 56.6 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 173 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48987

**Significant Events Ahead** *(all dates Eastern and subject to change):*

06/13/07 -- EVA-2 (~2:03pm, 6.5 hrs)

06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)

06/17/07 -- EVA-4       **[added]**  
06/19/07 -- STS-117/Atlantis/13A undocking   **[new]**  
06/21/07 -- STS-117/Atlantis/13A KSC landing (~1:54pm EDT)   **[new]**  
07/13/07 -- FGB solar array retraction  
07/13/07 -- ESA ships ATV to Kourou/French Guyana  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks *[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking (SM aft port)  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking

04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/10/07  
**Date:** Sunday, June 10, 2007 5:35:36 PM  
**Attachments:** [image001.gif](#)

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### ISS On-Orbit Status 06/10/07

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – visitors dropping in on Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Sunita Williams). Day 183 in space for Suni (launched 12/9/06 on STS-116). Ahead: Week 8 of Increment 15.*



**STS-117/Atlantis docked smoothly** on time at the PMA-2 (Pressurized Mating Adapter-2) port at 3:36pm EDT, and the station hosts ten occupants again as Mission 13A is underway. All docking hooks were closed at 3:48pm, and the station was reoriented as planned to minimize the risk of micrometeoroid/debris impacts upon the Shuttle (-x-axis in velocity vector, +z-axis in local vertical). Hatches were open at 5:04pm, and the new crew was welcomed aboard the ISS and given the mandatory safety briefing (5:25pm). Later, the S3/S4 trusses were unberthed in the Shuttle PLB (Payload Bay) with the SRMS (Shuttle Remote Manipulator System), handed off to the ISS SSRMS (Space Station RMS) and "parked" overnight for tomorrow's installation.

Wakeup time for the ISS crew had shifted once more this morning, to 9:08am EDT, for a long day (sleep time tomorrow morning: 12:38am).

Before Shuttle arrival, CDR Yurchikhin serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent

bed #2 of the regenerable dual-channel filtration system. The regen process will be terminated at ~11:40pm EDT. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

The CDR also performed final STTS communications configuration checks for the docking, while FE-2 Williams connected UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cables at the Lab & Cupola RWS (Robotics Work Stations) for the SSRMS (Space Station Remote Manipulator System) video coverage of the docking and subsequent S3/S4 transfer operations.

While Yurchikhin conducted a final checkout of the photo/video equipment for the RPM (Rbar Pitch Maneuver) before Atlantis docking, Kotov verified the readiness of the communications configuration required for the photo shoot. *[Service Module (SM) window #9 is now open again, and the crew was given the Go to use it for video/photography as desired.]*

Shortly before the docking, FE-1 Kotov configured the Russian MCS (Motion Control System) for the automatic "PMA-2 Arrival" mode, an operational sequence used to monitor Orbiter arrival at the PMA-2. Sunita confirmed this at 3:21pm. *[At "Capture Confirmed" (3:36pm), ISS attitude was immediately set to "free drift" to allow dampening out relative motions of ISS and Atlantis (with the ODS dampers/shock absorbers), then maneuvered to "Mated TEA" (Torque Equilibrium Attitude) to account for the new overall configuration with Atlantis docked. Later tonight it will maneuver to "Overnight Park" attitude when the S3/S4 truss elements are attached to the SSRMS and "parked".]*

Prior to final approach, Frederick "CJ" Sturckow took the Atlantis through the scheduled RPM at ~600 ft distance under the ISS, a full-circle backflip to allow digital imagery of its TPS (thermal protection system) from the ISS by Yurchikhin & Kotov, with photography commencing at 2:35pm and ending at 2:43pm, still in local daylight. *[The ISS crew had about 100 seconds actual shooting time to photograph the Orbiter TPS. Fyodor operated the 400mm-lens DCS (digital camera system) and Oleg wielded the long-barreled 800mm camera, each one attempting to obtain about 150 pictures. After the docking, the images will be downlinked for further analysis. Preliminary inspections after orbit insertion have not indicated any signs of tile damage.]*

At ~2:48pm (~575 ft), Atlantis initiated TORVA (Twice Orbital Rate V-bar Approach). The final Go for Docking was given at 3:03pm. Sunset occurred at 3:07pm, and Atlantis closed in a slow rate. Final Approach began at 3:30pm, followed by sunrise at 3:34pm. Docking occurred at 3:36pm with capture confirmed

and was completed with hard dock at 3:48pm.

After leak checks of the ODS (Orbiter Docking System) vestibule for about an hour, hatches were opened at ~5:04pm and hand shakes between the crews came 15 minutes later.

Joint crew activities after the Welcome ceremony included –

- Collection of air samples with the Russian AK-1M sampler in the SM, FGB, and Lab before and during ISS/STS hatch opening by Oleg Kotov,
- Safety briefing for all,
- IELK transfers for Anderson & Williams by Fyodor, assisted by Clay,
- Shuttle transfers by Sunita,
- CWC (Contingency Water Container) transfers,
- Installation of an IWIS RSU (Internal Wireless Instrumentation System/ Remote Sensor Unit) in the Shuttle airlock by Suni, and
- Setting up the transfer equipment for supplying Shuttle O<sub>2</sub> (oxygen) to the ISS to support the “Campout” by Reilly & Olivas in the Airlock (A/L) for the first EVA tomorrow.

Also after docking, Yurchikhin conducted the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Fyodor also took data on total operating time & ops durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

The CDR then supported the ground in activating the Elektron oxygen (O<sub>2</sub>) generator at 32A. *[As usual, Fyodor monitored the external temperature of the Elektron's secondary purification unit (BD) for the first 10 minutes of operations to ensure no overheating, a standard precaution. During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Working on the IMS (Inventory Management System), the CDR updated/edited its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Sunita transferred the new SCU-2 (Synchronization & Control Unit 2) for the video subsystem from Atlantis and installed it in the Avionics #1 Rack (LAB1D5). The

failed unit will be returned on 13A.

At ~4:58pm, Pat Forrester & Bru Archambault grappled the 35,000-lbs S3/S4 truss element assembly in the PLB with the Shuttle RMS, followed by its unberthing later after the Welcome ceremony. Handoff to the ISS SSRMS, "piloted" by Suni & Bru, is scheduled around 8:00pm, with SRMS ungrappling shortly thereafter. The S3/S4 package will then be "parked" overnight in space for temperature adjustment.

Clayton Anderson officially replaces Sunita Williams as Expedition 15 FE-2 tonight at ~6:45pm upon completion of the installation, by Fyodor & Clay, of Anderson's Soyuz TMA-10 seat liner and transfer of his Sokol suit equipment in place of Williams' IELK (Individual Equipment & Liner Kit), stowing the latter for return on 13A.1. Williams is now considered a member of the 13A crew. *[Williams joined the Expedition 14 crew on 12/11/06 arriving on Flight ISS-12A.1 and then transferred to Expedition 15 on 4/9/07 during Expedition 14/15 joint ops. With her planned departure on 6/17, Suni will have spent 190 days on ISS.]*

After a joint review of EVA-1 timeline & procedures at ~9:20pm, the two spacewalkers, Jim Reilly (EV1) & Danny Olivas (EV2), will begin their "campout" in the "Quest" A/L, starting mask prebreathe at ~11:23pm, then closing hatches and initiating depressurization of the CL (Crewlock) from 14.7 to 10.2 psi at ~12:18am. Sleep for the ISS crew will commence at 12:38am, for the Shuttle crew at ~1:08am.

Earlier today, the ISS crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR), RED resistive exercise device (FE-1, FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1). *[No exercise allowed on ISS or Shuttle during S3/S4 grappled by both arms.]*

No CEO (Crew Earth Observation) photo targets uplinked for today. There will be no CEO targets for the upcoming joint ops period due to unfavorable lighting conditions and task loading.

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

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Mean altitude -- 335.3 km

Apogee height -- 340.6 km

Perigee height -- 330.0 km  
Period -- 91.24 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0007841  
Solar Beta Angle -- 61.4 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in the last 48 hours -- 137 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48971

**Significant Events Ahead** (*all dates Eastern and subject to change*):

06/11/07 -- EVA-1 (~2:53pm, 6.5 hrs)  
06/13/07 -- EVA-2 (~2:03pm, 6.5 hrs)  
06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)  
06/17/07 -- STS-117/Atlantis/13A undocking (~11:31am)  
06/19/07 -- STS-117/Atlantis/13A KSC landing (~2:44pm)  
07/13/07 -- FGB solar array retraction  
07/13/07 -- ESA ships ATV to Kourou/French Guyana  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks [*under review*]  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking (SM aft port)

12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
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04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/09/07  
**Date:** Saturday, June 09, 2007 2:27:16 PM  
**Attachments:**

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**ISS On-Orbit Status 06/09/07**

All ISS systems continue to function nominally, except those noted previously or below. Saturday – and a busy prior-to-docking day.

**STS-117/Atlantis lifted off on time at 7:38pm EDT** last night flawlessly on Mission ISS-13A and is currently catching up with the ISS, carrying the seven-member crew of Commander Frederick Sturckow (“CJ”), and Mission Specialists Lee Archambault (“Bru”), Pat Forrester, Steve Swanson (“Swanny”), James Reilly (“JR”), John Olivas (“Danny”), and Clay Anderson. **We are off to a great mission!** *[Docking is scheduled for tomorrow afternoon (Sunday, 6/10) at about 3:39pm EDT. With the docking, ISS Stage 13A begins. After hatch opening, first tasks are safety briefing, swapping out rotating crewmembers Clay & Sunita’s IELKs (individual equipment and liner kits) in the individual’s seat in Soyuz TMA-10, including the tailored Sokol suits. Objectives of the 12-day mission include: Deliver & install the S3/S4 truss elements, deliver & deploy two new solar array wings (1A & 3A), retract the P6 2B array, transfer extra oxygen for EVA prebreathing in Airlock Campout, and exchange an ISS crewmember for another. An IWIS (Internal Wireless Instrumentation System) accelerometer will be installed temporarily in the Orbiter’s airlock. There will nominally be three EVAs (on FD4, FD6, and FD8). Landing will nominally take place at KSC on 6/19 at 2:43pm EDT. Increment ops will resume officially on 6/18 (FD11).]*

With the Shuttle on its way, the ISS crew could sleep longer, with their day/sleep cycle shifted by 3 hrs, currently at 5:00am – 9:00pm EDT. Tomorrow’s wake-up: 9:10am.

The station crew today prepared for tomorrow with a number of necessary pre-docking actions. Specifically,

- CDR Yurchikhin –
  - Pressurized the PMA-2 (Pressurized Mating Adapter 2) for ingress

and stowage after the Shuttle's arrival. *[PMA-2 will be the docking port for Discovery tomorrow];*

- FE-1 Kotov –
  - Connected the ITCS LTL (Internal Thermal Control System Low Temperature Loop) in the Lab for Atmospheric Revitalization Rack activation, and
  - Took a water sample of the Lab condensate tank and filled a CWC (Contingency Water Container) from the tank (~1.5 hrs);
- FE-2 Williams –
  - Swapped the channels of the THC CCAA (Temperature & Humidity Control Common Cabin Air Assembly) air conditioner system in the Lab,
  - Collected fluid samples of the MTL ITCS MTL (Moderate Temperature Loop) and ammonia coolant (PHOSRA-1) for return on STS-117,
  - Set up the cameras for the RPM (Rbar Pitch Maneuver) photo shoot tomorrow,
  - Installed the VTR (video tape recorder) bypass cable to allow video to and from ISS and the Orbiter, and
  - Configured PMDIS (Perceptual Motor Deficits in Space) hardware, including installation of the appropriate harddrive *[PMDIS investigates why Shuttle astronauts experience difficulty with hand-eye coordination while on orbit.]*

Before breakfast (5:40am), Williams logged overnight SLEEP (Sleep-Wake Actigraphy and Light Exposure during Spaceflight) data from her Actiwatch into the software application on the HRF-1 laptop for later download by her replacement, Clay Anderson. *[To monitor the crewmembers' sleep/wake patterns and light exposure, the special Actiwatch device measure the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition.]*

Oleg Kotov performed the periodic regeneration of the Russian Harmful Impurities Removal System (BMP) by starting the "bake-out" cycle to vacuum on absorbent bed #1 of the dual-channel filtration system. The bake-out will be terminated at ~7:20pm EDT. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning*

*solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, the CDR also performed preventive maintenance cleaning on the VPKhO, VDPPrK, VPrK, FS9 and V3 fans & grilles in the DC1 (Docking Compartment)

Fyodor Yurchikhin completed the periodic downlink of ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) AST spectrometer data from PCMCIA memory card (#925) via OCA. *[The PCMCIA was then re-inserted in the AST. The ALTCRISS spectrometer/dosimeter provides long-term records of space radiation in the SM. Yesterday, Fyodor performed shielding tile accommodation on the ALTEINO device, took photos of the configuration, and exchanged memory cards.]*

Sunita had another 30 minutes allocated for prepacking hardware slated for return on 13A/Atlantis.

Oleg conducted the weekly 10-min. CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card, to be updated with today's data, lists 13 water containers (~350 liters total) for the four types of water identified on board: technical water (336.6 l, for Elektron, flushing, hygiene), potable water, condensate water, waste and other.]*

Fyodor performed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

The crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

The exercise data files were transferred later by Oleg to the MEC (Medical Equipment Computer), as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Suni had her PFCs (Private Family Conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8

laptop), one at ~10:40am, the second at ~2:50pm.

At ~12:55pm EDT, Fyodor and Oleg conducted two PAO TV downlinks with messages of greeting and congratulations for two events: (1) an International Science Seminar "Space Technologies and Digital Communication Systems used in Rail Road Service" dedicated to the 70<sup>th</sup> session of General Assembly of the "International Rail Road Alliance" and 170<sup>th</sup> Anniversary of Russian rail roads, and (2) a Gala award meeting of International Leaders of the most successful companies in 2006 in Cannes, France, on 6/30. [*...We are sending best wishes to all participants and guests. You are helping a person to feel beautiful, which translates into being happy and loved. What can be greater than this job! You deserve recognition on a cosmic scale! We wish for you to remain goal-oriented leaders and stars. This event brought together participants from 33 countries, and today this event becomes not just international but planetary. Your bright eyes filled with much deserved pride for achieved success remind us of celestial galaxies which are visible from near-Earth orbit...*]

Working off the "time permitting" task list, Oleg completed another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Sony PD-150P camcorder from SM window #7 to obtain data about development of bioproductive and atmospheric processes in the South Atlantic at the beginning of summer in the southern hemisphere. [*Photo targets were the Baia Blanca Bay in the south of Argentina with the Benguela coastal upwelling near the coast of Angola), and in the near-delta area of the Brazilian river San Francisco the coastal Mauritanian upwelling near NW coast of Africa.*]

*SM Window #9:* The cover of SM window #9 is currently stuck in a half-open/half-closed position because of translational interference by one of the new SM debris panels (#29), as the crew confirmed visually. The crew stated that the SMDP panel is installed correctly and recommended that panel #29 be moved slightly to clear the translation path of the window cover. Under investigation.

*STS-117 FD2 Update:* What a spectacular launch yesterday! The vehicle is performing very well. Current orbit: 124 x 85 naut.mi. Today's activities are highlighted by the RCC (Reinforced Carbon-Carbon) leading edge survey and EMU checkout. At the portside OMS pod, the crew noticed and photographed minor damage to a thermal blanket, aft of the tiled area (i.e., ~4-5 inches of blanket torn at seam, with blanked corner sticking up). Docking will be on Sunday, 6/10, at 3:39pm.

### **Weekly Science Update** (*Expedition Fifteen -- 7<sup>h</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS): ALTEINO*

device is performing nominally. The most recent activities (shielding tile accommodation on ALTEINO device, photo of configuration, and memory card exchange) were performed on 6/8 June. Memory card dump/check is currently planned for 6/9 June.

*ANITA*: Planned.

*BCAT (Binary Colloidal Alloy Test)*: Reserve.

*CARDIOCOG-2*: Planned.

*CFE (Capillary Flow Experiment)*: “Once again Suni demonstrated her mastery of the CFE experiment. She completed the experiments on the CFE VG2 vessel and created conditions that will contribute to our overall knowledge beyond the expectations of the vessel. Her ability to move the fluid in ways that enhance the experiment has been a great benefit to our area of research. CFE appreciates the time and effort that Suni has given to us. CFE especially appreciates the farewell that she played for the last “lava lamp” run.”

*CHROMOSOME-2 (E14 SFP)*: Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus)*: There has been no change to the CSI-01 experiments or to CGBA-4. “Of course, we look forward to CHab1 & 2 removal on Flight Day 9 and their return home on 13A. A Canadian News agency will be interviewing one of our PIs for *C. elegans* (who is from Canada) about the experiment this weekend.”

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2)*: In support for BCAT-3 only.

*EarthKAM (Earth Knowledge Acquired by Middle School Students)*: Complete.

*EMCH (Elastic Memory Composite Hinge)*: Complete.

*EPO (Educational Payload Operation) Kit C*: Planned.

*IMMUNO (Saliva Sampling)*: Planned.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*: Complete.

*MISSE (Materials ISS Experiment)*: Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* Planned

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* Planned.

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* The PLATON pouch could not be located on board, therefore NOA-2 measurements could not be completed for both Russian Expedition crewmembers for both EVAs.

*NUTRITION:* Complete.

*SAMPLE:* Ongoing.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* This upcoming week Suni will complete her last scheduled week of sleep logging. Her last Sleep activity will be to doff and stow her Actiwatch. Clay will download her last data set.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* TRAC data session was completed nominally on 6/6, and the PI is happy with the operations. This was the second to last session for Sunita. "We are looking forward to the next session on Flight Day 5".

*CEO (Crew Earth Observations):* Through 6/4 the ground has received a total of 3,874 CEO images for review and cataloging for Increment 15. Target time acquisitions identified this week are: Santa Barbara Coast, California; Iceberg A22A; Araguinha Impact Crater; and Sao Paulo Brazil. One of the recent CEO views of LTER sites, Florida Coastal Everglades, will be published on NASA/GSFC's Earth Observatory website this weekend. Part of a fine mapping pass, it

shows the area of this ecosystem just south of Homestead, Florida. "We were especially pleased this week with your success in locating and acquiring excellent imagery of Iceberg A22A in the storm-tossed South Atlantic on 5/30. The monster berg is estimated to be over 25 miles long and nearly 15 miles wide! Your imagery represents our first IPY (International Polar Year) target acquisition for use in an ongoing scientific investigation by the National Snow and Ice Data Center. Kudos to all of you for your diligence with this challenging target."

No CEO (Crew Earth Observation) photo targets uplinked for today. There will be no CEO targets for the upcoming joint ops period due to unfavorable lighting conditions and task loading.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (*all dates Eastern and subject to change*):

06/08/07 -- STS-117/Atlantis/13A launch, 7:38pm (S3/S4 trusses)

06/10/07 -- STS-117/Atlantis/13A docking (~3:39pm)

06/11/07 -- EVA-1 (~2:53pm, 6.5 hrs)

06/13/07 -- EVA-2 (~2:03pm, 6.5 hrs)

06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)

06/17/07 -- STS-117/Atlantis/13A undocking (~11:31am)

06/19/07 -- STS-117/Atlantis/13A KSC landing (~2:44pm)

07/13/07 -- FGB solar array retraction

07/13/07 -- ESA ships ATV to Kourou/French Guyana

07/20/07 -- US EVA-9

07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/05/07 -- Progress M-59/24P undocking (DC1) & reentry

08/06/07 -- Progress M-61/26P launch

08/08/07 -- Progress M-61/26P docking (DC1)

08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking

08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking

08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing

08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*

09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1) & reentry

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking (SM aft port)  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/08/07  
**Date:** Friday, June 08, 2007 2:30:12 PM  
**Attachments:**

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### **ISS On-Orbit Status 06/08/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, FE-2 Williams logged overnight SLEEP (Sleep-Wake Actigraphy and Light Exposure during Spaceflight) data from her Actiwatch into the software application on the HRF-1 laptop for later download by her replacement, Clay Anderson, arriving on Sunday. *[To monitor the crewmembers' sleep/wake patterns and light exposure, the special Actiwatch device measure the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition.]*

CDR Yurchikhin and FE-1 Kotov completed final post-EVA cleanup activities,-

- Removing oxygen tanks (BK3), telemetry systems (BRTA) and 825M3 batteries from the Orlan-M suit backpacks,
- Refilling the spacesuits' feedwater bladders with water,
- Arranging the Orlans in the DC1 (Docking Compartment) to dry out during the day's course,
- Preparing the Orlans and the BSS equipment for storage, and
- Removing & stowing the BNP portable oxygen (O<sub>2</sub>) repress tank from the SM RO (Work Compartment).

The two spacewalkers also conducted the standard post-EVA Orlan debriefing with ground specialists via S-band. *[Some highlights: All hardware was brought inside, no items were lost. In addition to the paint flake seen drifting off, a piece of very lightweight MLI (Multi-Layer Insulation), size 3x5 cm, came off cables that had been outside for a length of time. Russian lanyards are too long when using RETs (retractable equipment tethers); the latter are very useful. Crew recommends that the detailed setting up of the tool caddy be added to the Russian Hydrolab*

*underwater training at Star City (similar to what is being done in JSC's NBL). It was good to see that two "rookie" spacewalkers did so well, giving confidence to future rookies.]*

Yurchikhin worked on recharging a total of 10 batteries for the DCS digital still cameras in two batches of four simultaneously plus one batch of two. Of the 10, eight will be used for the Orbiter RPM (Rbar Pitch Maneuver) photo shoot on Sunday and two are for the first 13A spacewalk, EVA-1, on Monday (6/11, starting at ~2:53pm EDT). *[Rbar = along the radius vector of the ISS, downward.]*

Also in preparation for the upcoming high-pressure P/TV (Photo/Video) activity during the RPM, FE-1 Kotov worked throughout the day on formatting the necessary P/TV storage devices. *[Formatted, in the Kodak DCS 760 camera on station power, were five 1GB EVA Flash Cards plus three PCMCIA 1GB Microdrives, each one taking ~20 minutes. Afterwards, the reformatted cards and microdrives were transferred to the SM (Service Module) for the DCS 760 camera configuration to get ready for the RPM documentation.]*

For the docked period ahead, FE-2 Williams installed the ISS-side string of the BPSMU (Battery Powered Speaker Microphone Unit). *[After Shuttle docking, cables connected to the Shuttle-half of the drag-through QD (quick disconnect) will be installed by the Shuttle crew.]*

Sunita also packed up and relocated two ISS spacesuits (#3006, #3008) from the U. S. Airlock (A/L) to the Node to make room in the A/L for the 13A EMUs arriving with the Shuttle.

Working on the MELFI (Minus-Eighty Laboratory Freezer for ISS) rack, Sunita transferred trays between MELFI Dewars to make Double Coldbag packing for 13A return more convenient and efficient. *[The first part of this task, preparing box modules in Dewars 1 & 2 by removing Velcro straps to facilitate Coldbag packing, was completed by Suni already on 5/25.]*

Yurchikhin completed the periodic recharging of the new Motorola-9505 Iridium satellite phone brought up on Soyuz 14S, a monthly routine job. *[After retrieving it from its location in the TMA-10 descent module (BO), Fyodor initiated the recharging of its lithium-ion battery, a 30-min. process, monitoring the process every 10-15 minutes as it takes place. Upon completion, the phone will be returned inside its SSSP Iridium kit and stowed it back in the BO's operational data files (ODF) container. The satphone accompanies returning ISS crews on Soyuz reentry & landing for contingency communications with SAR (Search-and-Rescue) personnel after touchdown. The Russian-developed procedure for the monthly recharging has been approved jointly by safety officials. During the procedure, the*

*phone is left in its fire-protective fluoroplastic bag with open flap.]*

The two Flight Engineers reviewed the Robotics plans for next week, including timeline, RWS (Robotics Work Station) and DOUG (Dynamic Operations Ubiquitous Graphics) setups, DOUG target cheat sheets, etc., for the upcoming 13A assembly & EVA activities with the Canadian-built SSRMS (Space Station Manipulator System).

Afterwards, Sunita and Oleg held a 30-min. teleconference via S-band/audio with ground specialists to discuss the Robotics ops.

Oleg collected the periodic cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Likewise, Suni used the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit) for the regular atmospheric check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide). Batteries were to be replaced if necessary. *[CSA-CP measurements were gathered with the new 12A.1 units #1051 (prime) & #1044 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1007 for CO<sub>2</sub> in SM and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1051, and returned to their regular locations, but CSA-O<sub>2</sub> units #1041 & #1048 were pre-packed for 13A return.]*

FE-2 completed the regular bi-weekly maintenance reboot of the OCA Comm Router SSC (Station Support Computer).

The crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

The exercise data files were transferred later by Suni to the MEC (Medical Equipment Computer), as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage

medium (done six times a week).

As a voluntary task list item on his “free” time, Fyodor did today’s routine maintenance of the SOZh (ECLSS) environmental control & life support systems in the SM, including ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), Fyodor also updated/edited its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

At ~4:45am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

The crew’s regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio is timelined later at ~4:10pm.

At ~6:30am, Sunita Williams used the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) to hold a ham session with college students at Colegio La Salle in the city of Palencia, Cerraro region, Spain. *[Palencia is the capital city of the province of Castilla and Leon, 235 km from Madrid. “What did you have to study to be an astronaut?”; “Do you get more tired in space than when you are on Earth?”; “Have you seen a Flying Saucer?”; “How many calories do you get every day?”; “How do you differentiate days from night?”; Are there different rooms in the space ship or is there only one in which you spend all the time?”]*

*BRI Failure Update:* With the failure of the Russian Smart Switch Router (BRI) in the SM, network connections for the SSC-2 and SSC-3 client laptops cannot be recovered before 13A arrives. The crew has bypassed the BRI by connecting SSC-1 directly to the SSC router in the USOS (US segment), making this laptop the only SSC available in the SM. The crew was informed that another SSC client can be set up for them in the Lab if needed. Also, ground engineers are preparing a task item for the crew to hook up the SM Printer to the SSC-1 hardline.

*STS-117 Update:* Countdown for tonight’s launch of Atlantis is going well. The External Tank has been filled and is in stable replenishment mode since 12:50pm EDT. The launch team is not working any issues at this time, and the Ice Inspection Team has arrived at the launch pad. Weather forecast remains at a 20% chance of weather prohibiting launch due to cumulus clouds. At launch time (7:38pm EDT), the ISS will be off the south coast of Australia, just after orbital sunrise. After Shuttle liftoff, the first two maneuver burns are scheduled as follows: OMS-2 at 8:15pm, and NC-2 at 10:59pm. Docking will be on Sunday, 6/10, at 3:35pm.

*STS-117 crew:*

- CDR Frederick Sturckow (“CJ”),
- PLT Lee Archambault (“Bru”),
- MS1/EV3 Pat Forrester,
- MS2/EV4 Steve Swanson (“Swanny”),
- MS3/EV1 James Reilly (“JR”),
- MS4/EV2 John Olivas (“Danny”),
- MS5/FE-2-E15 Clay Anderson.

*Correction of EVA Tally:* The EVA statistics in the 5/31 & 6/6 On-Orbit Status reports had Fyodor Yurchikhin’s name inadvertently replaced by Tyurin’s name. For Fyodor, EVA-18 and -19 were of course the first and second spacewalks. The up-to-date tally should therefore read: *“It (EVA-19) was the 83<sup>d</sup> spacewalk for ISS assembly & maintenance, the 55<sup>th</sup> from the station, the 22<sup>nd</sup> from Pirs, and the second each for Yurchikhin and Kotov. After today’s spacewalk, 60 NASA astronauts, 19 Russians and eight astronauts representing Japan (1), Canada (2), France (1), Germany (1) and Sweden (3) have logged a total of 509 hrs 5 min outside the station on building, outfitting and servicing.”* Sorry.

No conventional CEO (Crew Earth Observation) photo targets uplinked for today, but Sunita received kudos for some excellent shots of the breakup of Iceberg A22A. There will be no CEO targets for the upcoming joint ops period due to unfavorable lighting conditions and task loading.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

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06/11/07 -- EVA-1 (~2:53pm, 6.5 hrs)

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06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)

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08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
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10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks *[under review]*  
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12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
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04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/07/07  
**Date:** Thursday, June 07, 2007 3:05:39 PM  
**Attachments:**

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### **ISS On-Orbit Status 06/07/07**

All ISS systems continue to function nominally, except those noted previously or below.

After yesterday's successful Russian EVA-19, the crew today is enjoying a rest day, with delayed wake-up at 6:30am EDT and regular sleep time tonight at 5:30pm.

Before breakfast, FE-2 Williams logged overnight SLEEP (Sleep-Wake Actigraphy and Light Exposure during Spaceflight) data from her Actiwatch into the software application on the HRF-1 laptop for later download by her replacement, Clayton Anderson, arriving on Sunday. *[To monitor the crewmembers' sleep/wake patterns and light exposure, the special Actiwatch device measure the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition.]*

Cleaning up after the spacewalk, FE-1 Kotov –

- Stowed the MO-9 “Urolux” urine biochemistry test hardware,
- Took post-EVA radiation readings of the “Pille-MKS” dosimeters carried by the spacewalkers in their Orlan suits,
- Restowed the medical/first aid kits set up on 5/25 to support the suited dry-run and the two spacewalks, and
- Downlinked EVA-19 digital photography.

CDR Yurchikhin meanwhile supported the ground in activating the Elektron oxygen (O<sub>2</sub>) generator at 32A. *[As usual, Fyodor monitored the external temperature of the Elektron's secondary purification unit (BD) for the first 10 minutes of operations to ensure no overheating, a standard precaution. During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after*

*Elektron startup.]*

Yurchikhin also initiated (and terminated) a one-hour repressurization of the cabin atmosphere with air from Progress M-60/25P tankage to adjust total pressure after last night's DC1 repress from the cabin.

Both spacewalkers had their standard post-EVA PMCs (Private Medical Conferences).

As a voluntary task list item on his "free" time, Oleg did today's routine maintenance of the SOZh (ECLSS) environmental control & life support systems in the SM (Service Module), including ASU toilet facilities systems/replaceables.

With physical exercise reduced today, the crew worked out for one hour each on the VELO bike with bungee cord load trainer (CDR, FE-1, FE-2).

Afterwards, Suni copied Fyodor's, Oleg's and her own exercise data files to the MEC (Medical Equipment Computer) for downlink.

At ~7:50am EDT, the two cosmonauts had a VHF/audio interview with Elena Belograzova, a correspondent of the magazine "Rossiysky Kosmos" (Editor-in-chief: Veteran Salyut-6/Salyut-7/Mir Cosmonaut Viktor Savinykh). [*"What did you manage to do during these two months?"; "Your impressions of the EVA?"; "Did you observe silver clouds?"*]

At ~1:50pm, Fyodor and Oleg downlinked a PAO TV message of greetings to the citizens of Gagarin (Smolensk Province), congratulating them on the 300<sup>th</sup> Anniversary of their city. [*Formerly known as Gzhatsk, the town was originally founded as a wharf on the river Gzhat on June 5, 1705 by decree of Peter the Great, intended for commerce with St. Petersburg and Riga. In 1968 the town was renamed after Yuri Gagarin, the first cosmonaut who was born in the adjacent village of Klushino in 1934. "...Your town's tough past, people's courage and optimism forged in battlefield and in hard work were instrumental in raising a great Russian man, Yuri Gagarin. We believe that it was a historical destiny..."*]

Afterwards, the crew also downlinked best wishes and valedictory words to the year 2007 school graduates of Moscow's High Schools, to be replayed at a Senior Prom, a big theatrical performance on 6/23 at the large Moscow Olympiysky Sport Arena, with 2500 seniors expected to participate.

*BRI Failure:* Last Monday (6/4) the crew reported the failure of the Russian Smart Switch Router (BRI). There are no spare routers on-board. Recovery options are being assessed. [*BRI is part of the RS OpsLAN network with connections to the*

*three SSC (Station Support Computer) clients and a network printer in the RS (Russian segment). The crew bypassed the unit by connecting SSC1 directly to the SSC router in the USOS (US segment), making this laptop the only SSC available in the SM (SSC2, SSC3 and the SM printer remain unable to connect to the network, but the printer can be connected directly to the SSC1 port). This did not affect yesterday's EVA-19 and will not be an impact on 13A. Also, the TORU manual teleoperator control's video system ("Klest" & "Simvol-Ts") is not compromised.]*

#### *EVA-19 Observations:*

- Yurchikhin's spacewalk was briefly interrupted by his having to return to the DC1 to reconfigure the BSS (Orlan interface unit) in order to stop a very small O<sub>2</sub> leak noted at TsUP via VHF telemetry. The current suspect is an improperly seated poppet on one of the fluid umbilicals connected to the BUS (Russian equivalent of the "Quest" Airlock's OSCA/On-Board Spacesuit Control Assembly). The BUS supplies the Orlans with coolant and O<sub>2</sub> while in the DC1, getting its O<sub>2</sub> from four bottles manifolded to it. Further troubleshooting, including inspection of the poppets, will be scheduled by TsUP.
- On EVA-19, the crew had two DCS 760 digital cameras ready (one of them as backup), after the DCS 760 used on EVA-18 on 5/30 had been found to contain no pictures after the spacewalk, probably due to the battery being depleted quickly by the thermal blanket strapped too tight, thus keeping the shutter button depressed (another "lesson learned"),
- During EVA-19, the crew reported an MMOD (micrometeoroid/orbital debris) impact hole on the zenith/port side of a propellant pump cover on the FGB, looking like a "bullet hole with burnt edges". Downlinked photographs will be analyzed.
- A discrepancy was discovered between the procedure used for prebreathing for EVA from DC1 and the applicable Flight Rule (B13-108, EVA Pre-Breathe Protocol for Russian Orlan EVA). After review by flight surgeon experts, the IMMT (ISS Mission Management Team) today decided to reevaluate the written FR in light of the proven, to date always successful procedure. *[The procedure defines the start of suit purging as start of pre-breathe, whereas the FR defines it as the conclusion of the purge, with six minutes in between.]*

*STS-117 Update:* Launch countdown is going well and no significant issues are being worked. Because of weather conditions at KSC yesterday, the countdown is

currently about 6-7 hours behind against the nominal schedule. The launch team will make up this time today. The forecast for weather prohibiting a launch tomorrow evening decreased from 30% to 20%, and for a 24-hour delay from 40% to 30%.

*Correction of TRAC Record:* Yesterday's session by Sunita with the NASA-sponsored German/Canadian experiment TRAC (Test of Reaction & Adaptation Capabilities) was her seventh, not her eighth, as erroneously reported here. The eighth will be completed by Suni during docked operations next week.

No conventional CEO (Crew Earth Observation) photo targets uplinked for today, except perhaps the breakup of Iceberg A22A. There will be no CEO targets for the upcoming joint ops period due to unfavorable lighting conditions and task loading.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
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**ISS Orbit** (*as of this morning, 6:43am EDT [= epoch]*):

Mean altitude -- 335.5 km

Apogee height -- 340.7 km

Perigee height -- 330.3 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007754

Solar Beta Angle -- 72.1 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 9 m (small effect of RS EVA-19 thrusting/venting)

Revolutions since FGB/Zarya launch (Nov. 98) -- 48923

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/06/07  
**Date:** Wednesday, June 06, 2007 4:38:52 PM  
**Attachments:**

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### **ISS On-Orbit Status 06/06/07**

All ISS systems continue to function nominally, except those noted previously or below. ***EVA-19 was successfully completed.***

The Orlan spacewalk by CDR Yurchikhin and FE-1 Kotov from the DC1 (Docking Compartment) airlock lasted 5 hrs 37 min. All objectives were successfully achieved. The spacewalkers –

- (1) Installed the platform with three BIORISK-MSN (BIO-2) experiment containers on the DC1,
- (2) Routed & mated an external Ethernet cable for the new ISL (Integrated Station LAN) on the FGB, and
- (3) Installed the remaining 12 panels of two SMDP (Service Module Debris Panel) bundles for micrometeoroid protection on the Service Module (SM).

The spacewalk began 7 minutes early, with EVA hatch open at 10:23am EDT, and ended at 4:01pm. *[It was the 83<sup>rd</sup> spacewalk for ISS assembly & maintenance, the 55<sup>th</sup> from the station, the 22<sup>nd</sup> from Pirs, the seventh for Tyurin and the second for Kotov. After today's spacewalk, 60 NASA astronauts, 19 Russians and eight astronauts representing Japan (1), Canada (2), France (1), Germany (1) and Sweden (3) have logged a total of ((509 hrs 5 min)) outside the station on building, outfitting and servicing.]*

To accommodate the spacewalk schedule, the crew's activity cycle was shifted for a 30 min longer sleep in the morning (i.e., wake-up 2:30am EDT) and a 3.5-hrs delayed bedtime tonight (i.e., sleep 9:00pm). Wakeup tomorrow morning will be at 6:30am (until the regular 5:30pm).

Before breakfast, FE-2 Williams logged overnight SLEEP (Sleep-Wake Actigraphy and Light Exposure during Spaceflight) data from her Actiwatch into the software

application on the HRF-1 laptop. *[To monitor the crewmembers' sleep/wake patterns and light exposure, the special Actiwatch device measure the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition.]*

After morning inspection, all pre-EVA activities had proceeded smoothly and on schedule, starting out with Yurchikhin and Kotov taking another MO-9 "Urolux" urine biochemistry test before breakfast. *[A second session with the Urolux equipment will be conducted by both crewmembers tonight (~5:30pm) after post-EVA station repress.]*

Before retreating to the DC1, Yurchikhin worked on deactivating the Elektron oxygen (O<sub>2</sub>) generator after purging its BZh Liquid Unit with nitrogen (N<sub>2</sub>) at 0.65 kg/cm<sup>2</sup> via its KE3 and VN3 valves.

FE-2 Williams meanwhile hooked up the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable at the Cupola RWS (Robotics Work Station) and powered up its PCS (Portable Computer System) laptop in support of EVA video coverage (great views!).

For completing systems set-ups in DC1 and PkhO (Transfer Compartment) in pre-EVA configuration, the CDR and FE-1 had about an hour reserved.

Next steps by Fyodor and Oleg were then to

- Check out the Orlan-M spacesuits and their systems as well as the suit interface control panels (BSS) in DC1 & PkhO,
- Retest the BK-3 primary & backup oxygen (O<sub>2</sub>) tanks of the Orlans and DC1,
- Disassemble the DC1 air duct, but leaving the V3 fan in place, and
- Set up the communications links necessary for the spacewalk from the DC1.

After a "lunch" break (6:15-7:05am), the spacewalkers, with Sunita's assistance, conducted final inspection of the suits, BSS interface units & biomedical parameter telemetry, including VHF/voice & biomedical electrode belt and telemetry hookups via the BSS (later by the wireless in-suit Tranzit-B radio telemetry system) for vital signs and equipment monitoring.

ISS systems reconfiguration activities by Sunita in support of the spacewalk included -

- Verifying the Sputnik-SM ham radio equipment (Kenwood-D700 transceiver was deactivated,
- Changing settings of the DSD pressure alarm sensor,
- Deactivating a DS-7A Smoke Detector in the SM PkhO (Service Module

- Transfer Compartment),
- Setting up the PSS Caution & Warning System in the FGB,
  - Turning off two fans (VP1,2) for CO<sub>2</sub> absorption,
  - Removing SM air ducts to enable RO-PkhO hatch closure,
  - Deactivating VN1 air heaters and VK1 fans,
  - Closing external protective shutters of SM windows #6, #8, #12, #13, #14,
  - Shutting down the SRV-K2M condensate water processor (after SKV-2 air conditioner had been turned off),
  - Powering off the electrical food heaters in the galley,
  - Opening the overhead hatch MPEV (Manual Pressure Equalization Valve) in the Node (with muffler installed), and
  - Readying the Kodak DCS 760 EVA cameras, before turning them over to the spacewalkers (one to be taken outside, the other left in the DC1 as backup).

At ~8:30am, Yurchikhin and Kotov donned the Orlans and ancillary gear, assisted by Williams, performed final leak checks at 9:05am and closing the hatchways between SM RO/PkhO (Working Compartment/Transfer Compartment) and PkhO/SU (DC1 Transfer Vestibule) at ~9:30am, then sealing the Orlan backpacks, followed by Orlan and BSS control checks. Final checkout of suits and their controls included checking for leak during successive stages of DC1 depressurization. *[Pressure inside the Orlans was reduced to 0.42 at (6.2 psi). After suit purge, the spacewalkers had a 30-minute oxygen prebreathe period, as pressures between DC1 and the PkhO were equalized and then further reduced.]*

Sunita Williams at first remained in PkhO and later also closed the hatch between the FGB PGO (Instrumentation Cargo Compartment) and the SM, staying in the FGB+US segment (USOS).

During the EVA, Sunita had another one hour allocated for prepacking hardware slated for return on 13A/Atlantis.

At 11:01am, after the spacewalkers had mated the external OpsLAN (Operations Local Area Network) Ethernet cable, Suni successfully verified ISL (Integrated Station LAN) connectivity from a Lab SSC (Station Support Computer) laptop. *[Using the "PingMaster" application and "pinging" the network with a double click for a "green" response.]*

While Sunita was having the USOS all to herself, she undertook another run, her eighth, with the NASA-sponsored German/Canadian experiment TRAC (Test of Reaction & Adaptation Capabilities). After setting up the video gear and assembling the TRAC hardware in the work area (i.e., laptop, joystick, headphones, and time box), the FE-2 performed her data take session, later closing out and

stowing the equipment. (Done last: 4/13), *[TRAC tests the idea that the decrease in motor skills reported by some astronauts (for example, hand-eye coordination), is due to the brain adapting to being in space. By testing hand/eye coordination of crewmembers, scientists hope to test the theory that while the brain is adapting its sensory-motor functions to space it is unable to fully provide the resources necessary to perform normal manual skills, i.e., the data will be used to show that adaptation to zero-G draws on resources normally used for computational tasks, for example. Crewmembers test their hand-eye coordination prior to the mission, while on orbit and then again when they have returned to Earth. TRAC hardware includes a laptop mounted to a table and a joystick to control the cursor on the PC screen. Also used are audio headphones and a reaction time box to respond to audio and visual stimuli. For the test the crewmember is sitting on the floor of the Lab module, with legs restrained and the work table on the legs.]*

Williams also conducted the periodic (every two weeks) inspection of the RED (Resistive Exercise Device) with canister cords and accessory straps as well as the canister bolts for re-tightening if required.

Afterwards, the FE-2 completed a reduced (1-hr) physical workout on the RED.

After return and ingress of Yurchikhin and Kotov from the EVA at 4:01pm, with DC1 airlock repressurization from SM cabin air, the crewmembers opened hatches and reentered the SM for their second MO-9 "Urolux" biochemical urine test.

This will later tonight be followed by the crew resetting communications, conducting ISS activation operations and restoring systems configurations in the DC1 and other RS modules to pre-EVA conditions, then installing the DC1 air ducts.

FE-2 Williams will return ISS systems to their initial states, including air ducts, Vozdukh CO<sub>2</sub> scrubber and Sputnik-SM amateur radio.

*STS-117 Update:* Launch countdown for Friday, 6/8, is going well and no significant issues are being worked. For a 6/8 launch attempt: 30% chance of weather prohibiting launch due to thunderstorms with associated anvils. Transatlantic Abort (TAL) weather is forecast "GO" for Zaragoza, Spain and Istres, France. For a 6/9 (24 hour delayed) launch attempt: 40% Probability of KSC weather prohibiting launch due to thunderstorms with associated anvils and cumulus clouds. TAL weather is forecast "GO" for Istres, France.

No CEO (Crew Earth Observation) photo targets uplinked for today, and there will be no CEO targets for the upcoming joint ops period due to unfavorable lighting conditions and task loading.

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**ISS Orbit** (*as of this morning, 7:55am EDT [= epoch]*):

Mean altitude -- 335.5 km  
Apogee height -- 340.6 km  
Perigee height -- 330.4 km  
Period -- 91.24 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0007585  
Solar Beta Angle -- 73.9 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in the last 48 hours -- 70 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48908

**Significant Events Ahead** (*all dates Eastern and subject to change*):

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06/10/07 -- STS-117/Atlantis/13A docking (~3:38pm)  
06/11/07 -- EVA-1 (~2:53pm, 6.5 hrs)  
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06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)  
06/17/07 -- STS-117/Atlantis/13A undocking (~11:31am)  
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07/13/07 -- FGB solar array retraction  
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08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry

10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking (SM aft port)  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/05/07  
**Date:** Tuesday, June 05, 2007 2:04:47 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

### **ISS On-Orbit Status 06/05/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, FE-2 Williams logged overnight SLEEP (Sleep-Wake Actigraphy and Light Exposure during Spaceflight) data from her Actiwatch into the software application on the HRF-1 laptop for later download by her replacement, Clayton Anderson, arriving next Sunday (6/10). *[To monitor the crewmembers' sleep/wake patterns and light exposure, the special Actiwatch device measure the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition.]*

In preparation for tomorrow's RS EVA #19, CDR Yurchikhin and FE-1 Kotov, joined by FE-2 Williams, conducted a tagup with ground specialists via S-band to review the updated EVA timeline. *[The Orlan spacewalk, now estimated at 5 hrs 50 min, will begin with DC1 (Docking Compartment) **hatch opening at 10:30am EDT** (ingress & hatch close at ~4:20pm). RGS (Russian Ground Site) comm "windows" with VHF/telemetry downlink will be open at 10:36am-10:54am, 12:04pm-12:27pm, 1:39pm-2:00pm, and 3:11pm-3:30pm. Due to the current high positive Beta angle (today peaking at 74 deg), the spacewalkers will experience no eclipses (night passes) but will observe four 10-min rest periods. EVA-19 objectives are: (1) Routing & mating the external Ethernet cable for the new ISL (Integrated Station LAN) on the FGB, (2) installing the remaining two SMDP (Service Module Debris Panel) bundles #2 & #3 with 12 panels for micrometeoroid protection on the Service Module (SM), and (3) installing the hardware for the BIORISK-MSN (BIO-2) experiment on the DC1.]*

Final EVA preparations by Oleg Kotov today included –

- Retrieving three Russian "Pille-MKS" radiation dosimeters, recording their dosages and equipping each Orlan (in pocket on left calf) with a sensor unit

(A0309 & A0310); a third sensor (A0307) was placed in the SM for background readings, and a fourth, A0308, remains on duty;

- Transferring the ID-3 personal dosimeters, normally worn on the flight suit, to the chest pocket of the Orlan's lining near the DIDBs (Disposable In-suit Drink Bags), later to be returned to the flight suits; and
- Setting up the equipment for tomorrow's planned "Urolux" biochemical urine test (PZE MO-9), standard operating procedure before & after each Orlan EVA.

Afterwards, Kotov prepared the BIORISK-MSN (BIO-2) experiment hardware for its outside exposure by opening the vent valves of the three payload containers. The task included taking documentary photographs for downlink via OCA.

FE-2 Williams set up the DCS 760 digital cameras for the Orlan EVA. Later today she will start charging the two camera batteries overnight to have them ready for the spacewalk tomorrow.

Later, Suni will shut down the amateur radio gear in the FGB (Ericsson) and SM (Kenwood) to prevent RF interference with the Orlan "Tranzit" systems during the spacewalk.

Also in preparation of the spacewalk, Oleg Kotov worked in the Soyuz TMA-10/14S spacecraft, docked at the FGB nadir port, to activate its ASU toilet facilities (for use by FE-2 during the spacewalk when the FGB/SM hatch is closed).

At ~9:00am EDT, the three crewmembers tagged up with ground specialists on S-band to discuss the downlinked imagery of their 30-min. skill training on 6/2 of the RPM (Rbar Pitch Maneuver) photo shoot, and the RPM photo/video activities ahead. *[Prior to docking next Sunday, the 360-degree RPM will allow a photographic survey of the Orbiter with the ISS DCS cameras from ~600 ft distance, using 400 & 800mm focal length lenses to focus on tile acreage and door seals. Time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

Williams conducted the routine status checkup and filter inspection of the running CSI-4/5 (CGBA Science Insert 4/5) payload of seed germination modules and nematode worms housed in the CGBA (Commercial Generic Bioprocessing Apparatus) incubator. *[The incubator is controlled from the ground with automatic video downlinked to Earth. Students in the U.S. and Malaysia are participating in educational activities in their classrooms while monitoring the growth in orbit.]*

Suni also continued preparations for the 13A EVAs by –

- Performing degassing on three EMU PWRs (Payload Water Reservoirs,

#1013/~21 lbs water, #1023/~21 lbs water, #1025/~19 lbs water), *[i.e., manually removing gas bubbles from the PWRs to minimize the amount of air introduced into the EMU feedwater tanks];*

- Configuring the “Quest” Airlock for the 13A EVAs, during which it will serve as “camp-out” home for four crewmembers *[i.e., swapping PHA (Prebreathe Hose Assembly) masks with PBA (Portable Breathing Assembly) masks, final temporary stowage bag packing, photography of spare SCU (Service & Cooling Umbilical), etc.];* and
- Retesting the DOUG (Dynamic Operations Ubiquitous Graphics) software which last week had a problem receiving telemetry due to incorrectly configured DOUG SSC (Station Support Computer) software. *[Suni was to execute a new startup procedure from the Cupola RWS (Robotics Workstation) and also to check cable connections and reboot the RWS and SSC laptops.]*

The crew was thanked for yesterday’s successful installations & checkouts of EMU METOX (Metal Oxide) canisters & REBA (Rechargeable EVA Battery Assembly) batteries, also for the suit checkouts themselves.

The FE-1 performed another one-hour cabin atmosphere repress from the Progress M-60/25P air storage tank.

In addition, Kotov completed the periodic CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout on the prime (#1051) and backup unit (#1044). *[The prime unit’s battery was changed out and then both instruments were zero-calibrated. Afterwards, the backup unit was stowed, while the prime unit’s datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

Yurchikhin completed the periodic (about twice a month) replenishing of the Elektron’s water supply for electrolysis, filling the KOV thermal loops’ EDV container with purified water from CWC (Contingency Water Container, #1043) collected by the U.S. CCAA (Common Cabin Air Assembly). *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron micropump shutdown.]*

The CDR performed today’s routine maintenance of the SM’s SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables, from the discretionary “time permitting” task list.

Later, Fyodor worked on the IMS (Inventory Management System), updating/editing its standard “delta file”, including locations, for the regular weekly automated export/

import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

The exercise data files will be transferred later by Suni to the MEC (Medical Equipment Computer), as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*2B Solar Array Retraction Update:* As a final checkout before its retraction during the 13A mission, ground engineers and flight controllers yesterday inspected the 2B solar array. The C/O consisted of a video survey of the array, followed by checkouts of the MDAs (Motor Drive Assemblies) on the mast and of the left & right blanket boxes, which will receive the folded panels. No new problems were revealed, and all MDAs performed nominally. To assist manually in the accordion-like retraction, if required, an improvised Teflon “poker” tool shaped like a hockey stick was built recently (5/17) by Sunita. *[A loose leader spring and off-nominal fold, both on the FCC (Flat Circuit Collector) material that composes most of the array, had been identified in an earlier survey.]*

Today's CEO (Crew Earth Observation) photo target was **Iceberg A22A** (*this target was below researcher's criteria for illumination, with only 16 deg of sun elevation at the time of this near-nadir pass. Satellite imagery trends suggested that there could have been significant breaks in the clouds near this target. Using the long lens settings for detail. There is no recent satellite imagery of this iceberg.*)

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:36am EDT [= epoch]*):

Mean altitude -- 335.6 km

Apogee height -- 340.7 km

Perigee height -- 330.4 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.000766

Solar Beta Angle -- 74.0 deg (magnitude peaking)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in the last 48 hours -- 70 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48892

**Significant Events Ahead** (*all dates Eastern and subject to change*):

06/06/07 -- Russian EVA-19 (~10:30am, 6 hrs; 12 SMDPs, OpsLAN/ISL cable, BIORISK payload)  
06/08/07 -- STS-117/Atlantis/13A launch, 7:38pm (S3/S4 trusses)  
06/10/07 -- STS-117/Atlantis/13A docking (~3:38pm)  
06/11/07 -- EVA-1 (~2:53pm, 6.5 hrs)  
06/13/07 -- EVA-2 (~2:03pm, 6.5 hrs)  
06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)  
06/17/07 -- STS-117/Atlantis/13A undocking (~11:31am)  
06/19/07 -- STS-117/Atlantis/13A KSC landing (~2:44pm)  
07/13/07 -- FGB solar array retraction  
07/13/07 -- ESA ships ATV to Kourou/French Guyana  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks [*under review*]  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking (SM aft port)

12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/04/07  
**Date:** Monday, June 04, 2007 2:42:02 PM  
**Attachments:**

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### **ISS On-Orbit Status 06/04/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 7 of Increment 15.*

Before breakfast, FE-2 Williams again logged the data collected by her SLEEP (Sleep-Wake Actigraphy and Light Exposure during Spaceflight) Actiwatch into the software application on the HRF-1 laptop for later download by her replacement, Clayton Anderson, arriving next Sunday (6/10). *[To monitor the crewmembers' sleep/wake patterns and light exposure, the special Actiwatch device measure the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition.]*

In preparation for the STS-117 RPM (R-bar Pitch Maneuver) activities on Sunday, Sunita took one blank and one white image with each of the four DCS-760 digital cameras on a PCMCIA 1GB microdrive. *[After their downlink to MCC-H, the images will be analyzed to determine which two of the 760s to use for the RPM.]*

In preparation for their Orlan spacewalk, EVA-19, on Wednesday (6/6), CDR Yurchikhin and FE-1 Kotov conducted a one-hour tagup with ground specialists via S-band to review the preliminary EVA timeline. *[EVA-19 by Fyodor (EV1) and Oleg (EV2) from the DC1 (Docking Compartment) airlock, estimated at 6 hrs duration, will begin with EV hatch opening at 10:30am EDT and last until an estimated ~4:30pm (hatch close). Due to the current high positive Beta angle, the spacewalkers will not experiences any eclipses (night passes) but will observe four 10-min rest periods. EVA-19 objectives are: (1) Routing and mating the external Ethernet cable for the new ISL (Integrated Station LAN) on the FGB, (2) installing the remaining two SMDP (Service Module Debris Panel) bundles #2 & #3 with 12 panels for micrometeoroid protection on the Service Module (SM), and (3) installing the hardware for the BIORISK-MSN (BIO-2) experiment on the DC1. {Note: ISL is an upgraded on-board LAN (local area network) utilizing Ethernet connectivity over*

*an ISL Router via cable or wireless (WAP/Wireless Access Point). ISL integrates all ISS "user" devices, including RS (Russian segment) docking video distribution, payload comm & downlink (from IP modules, e.g., Columbus or JEM), crew operations, procedures viewing, email, IP phone, etc. ISL eliminates drag-through cables in hatches, will be up to ten times faster than the current OpsLAN, and has provisions for future modules.}]*

CDR Yurchikhin's Orlan suit, which had a glove problem during EVA-18, has been adjusted and is cleared for EVA following a successful 20-minute in-suit test.

Working in the DC1, the two spacewalkers wrapped up EVA-19 preparations today by –

- terminating charging the first Orlan 825M3 battery pack and removing it from the charger,
- conducting leak checks and valve functionality tests on the Orlans & their BSS interface units,
- setting up DC1 comm by configuring for S/G (Space-to-Ground) String 1 (String 2 being down with suspected failed amplifier in SM comm panel; S/G backup will be available from the Lab during the EVA),
- configuring the in-suit "Tranzit" comm systems,
- conducting Orlan & BSS radio telemetry units (BRTA) checkout, Orlan comm checks and medical parameter testing of the BETA-08 ECG (electrocardiograph) belts with the "Gamma-1M" med complex from PKO med exam panel,
- performing pressure checks on the portable O<sub>2</sub> tanks (BK-3) and portable air repress bottles (BNP), and
- preparing the Orlan DIDBs (disposable in-suit drink bags) by filling them with fresh water and installing them in the suits.

Meanwhile, FE-2 Williams successfully completed the checkout of the EMU (Extravehicular Mobility Unit) suits. They are ready for the 13A EVAs.

Sunita also tested powered EMU TV equipment using REBA (Rechargeable EVA Battery Assembly) batteries.

The CDR had time set aside for transferring DVDs and CDs from the Progress M-60/25P cargo ship, with IMS (Inventory Management System) updating.

The FE-1 worked on the RSS1 laptop, installing new software (vers. 1.1) from DVD, and on the BRI Smart Switch Router, replacing its net configuration file. *[The new software allows a Ping test during EVA-19 (for verifying correct mating of the new U. S. Integrated Station LAN/ISL cable installation), supports connecting & testing a TV coder, and enables transition to the new ISL network configuration with the*

*Edge router installed by Sunita in the Lab on 3/19.]*

Suni conducted another session, her third, with the MedOps WinSCAT (Spaceflight Cognitive Assessment Tool) experiment by logging in on the MEC (Medical Equipment Computer) and performing the psychological evaluation exercise on the laptop-based WinSCAT experiment. *[WinSCAT is a time-constrained questionnaire test of cognitive abilities, routinely performed by astronauts aboard the ISS every 30 days before or after the PHS (periodic health status) test or on special CDR's, crewmembers or flight surgeons request.]*

At ~4:20pm EDT, TsUP/Moscow is scheduled to reactivate the Elektron O<sub>2</sub>generator at 32A, via S-band. As usual, Yurchikhin will support the operation by monitoring the external temperature of the Elektron's secondary purification unit (BD) for the first 10 minutes of operations to ensure no overheating, a standard precaution. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Fyodor performed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables, from the discretionary "time permitting" task list.

Oleg worked on the IMS (Inventory Management System), updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular 2.5-hr. physical workout program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

The exercise data files will be transferred later today by Suni to the MEC, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:21am EDT [= epoch]):

Mean altitude -- 335.6 km

Apogee height -- 340.8 km

Perigee height -- 330.5 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007682

Solar Beta Angle -- 72.5 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 71 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48876

**Significant Events Ahead** (all dates Eastern and subject to change):

06/06/07 -- Russian EVA-19 (~10:30am, 6 hrs; 12 SMDPs, OpsLAN/ISL cable, BIORISK payload)

06/08/07 -- STS-117/Atlantis/13A launch, 7:38pm (S3/S4 trusses)

06/10/07 -- STS-117/Atlantis/13A docking (~3:38pm)

06/11/07 -- EVA-1 (~2:53pm, 6.5 hrs)

06/13/07 -- EVA-2 (~2:03pm, 6.5 hrs)

06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)

06/17/07 -- STS-117/Atlantis/13A undocking (~11:31am)

06/19/07 -- STS-117/Atlantis/13A KSC landing (~2:44pm)

07/13/07 -- FGB solar array retraction

07/13/07 -- ESA ships ATV to Kourou/French Guyana

07/20/07 -- US EVA-9

07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/05/07 -- Progress M-59/24P undocking (DC1) & reentry

08/06/07 -- Progress M-61/26P launch

08/08/07 -- Progress M-61/26P docking (DC1)

08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking

08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking

08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing

08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*

09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1) & reentry

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)

10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing

10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks *[under review]*

10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking (SM aft port)  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/03/07  
**Date:** Sunday, June 03, 2007 12:39:30 PM  
**Attachments:**

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### **ISS On-Orbit Status 06/03/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Sunita Williams). Day 176 in space for Suni (launched 12/9/06 on STS-116). Ahead: Week 7 of Increment 15.*

Before breakfast, FE-2 Williams logged the data collected by her SLEEP (Sleep-Wake Actigraphy and Light Exposure during Spaceflight) Actiwatch into the software application on the HRF-1 laptop for later download by her replacement, Clayton Anderson, arriving a week from today (6/10). *[Earlier, Suni prepared the Actiwatch that Anderson will wear during his mission onboard the ISS. To monitor the crewmembers' sleep/wake patterns and light exposure, the special Actiwatch device measure the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE-2's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

CDR Yurchikhin completed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

In preparation for the next Orlan spacewalk, EVA-19, on 6/6 (Wednesday), FE-1

Kotov worked in the DC1 (Docking Compartment), terminating the charging of the second Orlan 825M3 battery pack and starting it on the first pack.

Working off the discretionary “job jar” task list, Sunita over the weekend consolidated/audited the on-board TVIS (Treadmill with Vibration Isolation & Stabilization) assembly kits.

Also on the task list is an in-depth review, by all crewmembers, of freshly uplinked updated JEUS (Joint Expedited Undock Sequence) procedures. *[JEUS was developed for the unlikely event that during the docked period an emergency should necessitate a quick Orbiter undocking and reentry, including the case where spacewalkers happen to be outside.]*

At ~2:00pm EDT, the crew will downlink PAO/TV greetings to the participants of the 11<sup>th</sup> International Economics Forum, to take place next weekend (6/8-10) at St. Petersburg, Russia. RSC Energia is one of the forum’s participants, represented by its President N. N. Sevastianov. *[Crew script: “...The Forum transformed into a very relevant tool since Russian business demonstrates its unheard of activity on the international arena. Russian economy is one of the fastest growing economies in the world; Russian companies earned international recognition, unimaginable just a few years ago. Close partnership between business, political and intellectual leaders can be instrumental in resolving today’s global economic development issues. This type of partnership is particularly important in space research and development of space technologies. Assembly and operation of the International Space Station is a vivid example of this type of partnership...”]*

The crew had their weekly PFCs (Private Family Conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop), Oleg at 6:50am, Fyodor at 10:15am, Suni at 11:41am EDT

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:04am EDT [= epoch]):

Mean altitude -- 335.7 km

Apogee height -- 340.8 km

Perigee height -- 330.6 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007591

Solar Beta Angle -- 69.6 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 62 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48860

**Significant Events Ahead** (all dates Eastern and subject to change):

06/06/07 -- Russian EVA-19 (~10:30am, 6 hrs; 12 SMDPs, OpsLAN cable, BIORISK payload)

06/08/07 -- STS-117/Atlantis/13A launch, 7:38pm (S3/S4 trusses)

06/10/07 -- STS-117/Atlantis/13A docking (~3:38pm)

06/11/07 -- EVA-1 (~2:53pm, 6.5 hrs)

06/13/07 -- EVA-2 (~2:03pm, 6.5 hrs)

06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)

06/17/07 -- STS-117/Atlantis/13A undocking (~11:31am)

06/19/07 -- STS-117/Atlantis/13A KSC landing (~2:44pm)

07/13/07 -- FGB solar array retraction

07/13/07 -- ESA ships ATV to Kourou/French Guyana

07/20/07 -- US EVA-9

07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/05/07 -- Progress M-59/24P undocking (DC1) & reentry

08/06/07 -- Progress M-61/26P launch

08/08/07 -- Progress M-61/26P docking (DC1)

08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking

08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking

08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing

08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*

09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1) & reentry

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)

10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing

10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks *[under review]*

10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking (SM aft port)  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 06/02/07  
**Date:** Saturday, June 02, 2007 2:27:52 PM  
**Attachments:**

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### **ISS On-Orbit Status 06/02/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 15 crew CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Sunita Williams, except for regular maintenance & voluntary work. Day 175 in space for Suni (launched 12/9/06 on STS-116).*

FE-2 Williams is completing the second day of her 5<sup>th</sup> and final session with the NASA/JSC experiment NUTRITION. During today's session, she collected another urine sample and stored it in the MELFI (Minus-Eighty Laboratory Freezer for ISS). The sampling kit was then stowed away.

In preparation for the next Orlan spacewalk, EVA-19 on 6/6 (Wednesday), CDR Yurchikhin and FE-1 Kotov worked in the DC1 (Docking Compartment) where they –

- terminated the discharge of the second Orlan 825M3 battery pack and started its recharge,
- set up the DC1 comm panel with Channel 1 (the failure of Channel 2 before EVA-18 is thought by specialists to be due to a failed amplifier in SM Comm Panel 2),
- readied Orlan replaceable elements (ORUs) and
- conducted another 2-hr. suited exercise for a comprehensive checkout.

Later, supported by photo/video documentation and ground specialist tagup, the two spacewalkers also configured the Ethernet cable assembly and the BIORISK payload kit for their scheduled external installation during EVA-19.

Sunita Williams meanwhile continued preparations for the 13A EVAs, today reviewing SAFER (Simplified Aid for EVA Rescue) computer-based training material and then testing two SAFER units (#1005 & #1006).

Afterwards, Suni also performed updated checkout ops on three PGTs (Pistol Grip Tools, #1008, #1005, #1001) with their specific batteries, crucial for the upcoming 13A spacewalks.

For today's "Saturday Science" program, Williams unstowed the CFE-VG2 (Capillary Flow Experiment – Vane Gap 2) hardware, secured it on the MWA (Maintenance Work Area) and then conducted the fluid tests. *[This investigation, the fourth of this experiment, was motivated by new science (i.e., a new meta-stable condition) discovered during the previous run, thought to be the last at that time.]*

Yurchikhin and Kotov ran through another 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, their third, using DCS-760 digital still cameras with 400 & 800mm lenses at SM windows 6 & 8 to take imagery of an Orbiter cut-out. Afterwards, Fyodor downlinked the obtained images to the ground for analysis, to be discussed at a subsequent tagup. *[The skill training prepares crewmembers for the bottomside mapping of the Orbiter at the arrival of STS-117/13A. During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Atlantis from SM windows 6 & 8, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

Suni completed the regular bi-weekly maintenance reboot of the SSC (Station Support Computer) File Server and OCA Comm Router laptops as well as the weekly reboot of the PCS (Portable Computer System) A31p laptops.

At ~9:35am EDT, the crew conducted their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

Afterwards, Suni copied Fyodor's, Oleg's and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

**Weekly Science Update** (*Expedition Fifteen -- 6<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* ALTEINO device is performing nominally..

*ANITA:* Planned.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2:* Planned.

*CFE (Capillary Flow Experiment):* Reserve.

*CHROMOSOME-2 (E14 SFP):* Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* In progress.

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* In support for BCAT-3 only.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Complete.

*EMCH (Elastic Memory Composite Hinge):* “The success of EMCH is truly out of this world. EMCH success on ISS has generated interest and considerations from TDRS, ISS re-supply missions, Lunar communications systems, DOD missions Operational Responsive Space, and future commercial antenna systems providing for example, ‘Internet in the sky’. These efforts have been inspirational to us at Composite Technology Development, Inc., as well as to our many family, friends, and colleagues around the world.”

*EPO (Educational Payload Operation) Kit C:* Planned.

*IMMUNO (Saliva Sampling):* Planned.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 “Pirs”.

*MULTIGEN-1:* Planned

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* Planned.

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* The PLATON pouch could not be located on board, therefore NOA-2 measurements scheduled on 5/29 and 5/31 could not be completed for both Russian Expedition crewmembers.

*NUTRITION:* “Sun, you’ve completed your final Nutrition blood draw and are well on your way to closing out the final session. All of us on the Nutrition team want to extend our deepest gratitude. You and Mike were our two pincushion pioneers and you’ve helped pave the way for some outstanding research on the ISS that has significant implications for long duration spaceflight.”

*SAMPLE:* Science team confirmed the freezing of SAMPLE samples of the first crew sampling session.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* In progress.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 5/25 the ground has received a total of 3,339 CEO images for review and cataloging for Increment 15. Target acquisitions identified this week are: Kabul, Afghanistan; Lima, Peru; Upheaval Dome Impact Crater; Florida Coastal Everglades; Shortgrass Steppe, Colorado; Lake Chad; Khartoum, Sudan; Lake Poopo, Bolivia; Nile River Delta; Cairo, Egypt; Galapagos Islands; Georgia Smoke Plume; and Barringer Impact Crater. A recent dramatic photo of Den Helder, Netherlands has been posted on NASA/GSFC’s Earth Observatory website this weekend. “It nicely depicts human impact on a geomorphically active landscape in a long, historical battle with the forces of wind and sea.”

Today's CEO (Crew Earth Observation) photo target was **Iceberg A22A** (*although this target was below researchers' criteria for illumination with only 18 degrees of sun elevation at the time of this pass, scientific interest is high to document the anticipated breakup of this still large iceberg. This pass is near nadir and satellite imagery suggests that this may have been the best weather yet in the area. Using the long lens settings for detail and looking for any other fragments of ice and smaller bergs as well*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:40am EDT [= epoch]*):

Mean altitude -- 335.8 km

Apogee height -- 341.0 km

Perigee height -- 330.6 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.000773

Solar Beta Angle -- 66.0 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in the last 48 hours -- 135 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48844

**Significant Events Ahead** (*all dates Eastern and subject to change*):

06/06/07 -- Russian EVA-19 (~10:30am, 6 hrs; 12 SMDPs, OpsLAN cable, BioRisk payload)

06/08/07 -- STS-117/Atlantis/13A launch, 7:38pm (S3/S4 trusses)

06/10/07 -- STS-117/Atlantis/13A docking (~3:38pm)

06/11/07 -- EVA-1 (~2:53pm, 6.5 hrs)

06/13/07 -- EVA-2 (~2:03pm, 6.5 hrs)

06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)

06/17/07 -- STS-117/Atlantis/13A undocking (~11:31am)

06/19/07 -- STS-117/Atlantis/13A KSC landing (~2:44pm)

07/13/07 -- FGB solar array retraction

07/13/07 -- ESA ships ATV to Kourou

07/20/07 -- US EVA-9

07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)

08/05/07 -- Progress M-59/24P undocking (DC1) & reentry

08/06/07 -- Progress M-61/26P launch

08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) *[under review]*  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
*[under review]*  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking (SM aft port)  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 06/01/07

**Date:** Friday, June 01, 2007 1:59:09 PM

**Attachments:**

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### **ISS On-Orbit Status 06/01/07**

All ISS systems continue to function nominally, except those noted previously or below. *The crew's work day is back on regular time (2:00am – 5:30pm EDT)...*

Today's day began with the routine checkup of Docking Compartment (DC1) circuit breakers and fuses. *[The monthly checkup in the "Pirs" DC1 looks at AZS circuit breakers on the BVP Amp Switch Panel (they should all be On) and the LEDs (light-emitting diodes) of 14 fuses in Fuse Panels BPP-30 & BPP-36.]*

Before breakfast, Sunita Williams began the first day of her final (fifth) run with the NASA/JSC experiment NUTRITION, for which she had to forego exercising and food intake for eight hours. *[Suni started the session by collecting a blood sample which she first spun in the RC (Refrigerated Centrifuge) and then placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. Williams also started the required 24-hour urine collection by securing specimens during the day, also stored immediately in MELFI. Activities were documented photographically by Oleg. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire).*

*The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

At ~4:30am EDT, the two spacewalkers, Yurchikhin and Kotov, tagged up with ground specialists for the standard post-EVA debrief, via S-band. During a subsequent RGS (Russian Ground Site) comm window (~8:00am), the CDR and FE-1 also consulted with the ground on Orlan spacesuit particulars, particularly in anticipation of next week's EVA-19 spacewalk (6/6).

Fyodor and Oleg completed final post-EVA cleanup activities. They -

- removed oxygen tanks (BK3), telemetry systems (BRTA) and 825M3 batteries from the Orlan-M suit backpacks,
- initiated discharge of the first 825M3 pack, later terminated the discharge and started discharging the second pack;
- refilled the spacesuits' feedwater bladders with water; and
- arranged the Orlans in the DC1 (Docking Compartment) to dry out during the day's course.

Further steps planned toward the EVA-19 are:

- 6/2 (Saturday): Charge first 825M3 battery pack; prepare Orlan ORUs and refurbish Orlans by installing ORUs; ready gloves; inspect Orlans.
- 6/3 (Sunday): Charge second battery pack.
- 6/4 (Monday): Perform Orlan & BSS leak checks and Orlan valves functional tests; replace BK3 tanks in DC1; perform Orlans & BSS telemetry and comm (via Orlans) checkout.

FE-2 Williams meanwhile disconnected the UOP DCP (utility outlet panel/display & control panel) bypass power cable at the Cupola RWS (Robotics Work Station).

FE-1 Kotov collected the periodic cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Likewise, Sunita used the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit) for the regular atmospheric check for

ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide). Batteries were to be replaced if necessary. *[CSA-CP measurements were gathered with the new 12A.1 units #1051 (prime) & #1044 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1007 for CO<sub>2</sub> in Service Module (SM) and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1051, and returned to their regular locations.]*

In the U.S. Airlock, Suni terminated charging on the second set of EMU batteries in the BSA (Battery Stowage Assembly), started on 5/30, for the 13A spacewalks.

Fyodor performed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), Oleg updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Back on their regular exercise regimen, the crew worked out for 2.5 hrs (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1).

Later, Suni copies Fyodor's, Oleg's and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:15am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~1:45pm, the station residents conducted a 30-min teleconference with the crew of STS-117/Atlantis (13A), now scheduled for launch a week from today (6/8).

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio is timelined at 3:40pm.

*BPK Troubleshooting Update:* When the new BPK Condensate Feed Pump in the RS (Russian segment) was found to be malfunctioning (unable to transfer water), it was replaced last week (5/24) with the old BPK which originally had its pump running continuously. After the crew replaced the latter with the pump from the new BPK, the old unit is working nominally. *[Background: The Russian SRV-K water processing system normally receives condensate from the SKV air conditioning units for processing. The condensate from SKV is an air/water mixture which is then separated in the BRPK separator into water and air. The air is vented into the cabin and the water goes into a small water tank (~180 ml), from which it is then sent through the BKO Water Purification Column for processing into potable water. Condensate collected in the USOS (US segment) is transferred in a CWC container to the SM for SRV-K processing. However, since it is not an air/water mixture it must be pumped first through the BPK Condensate Feed Pump to be converted into an air/water mixture, which is then send on into the BRPK for separation.]*

*MT Translation Update:* After the successful translation of the MT (Mobile Transporter) rail cart from Workstation 4 (WS4) to WS2 on 5/28, analyses begin tomorrow toward the planned post-13A return of the MT from the WS3 (to be attained during 13A after grappling the S3/S4 truss on FD3 at WS2) back to WS4. Planned window for the movement is 6/25-6/29. *[During the translation on 5/28, the sequence was briefly aborted between WS4 and WS3 because of an “overspeed” indication, after the MT moved an additional 6-10 inches as a result of stored energy in the TUS trailing umbilical system) cables, with brakes disengaged. When a similar issue occurred during a qual ground test, it was found to be due to the IMCA (Integrated Motor Controller Assembly) clutch not being properly engaged, requiring manual “pulsing” to engage. This remedy also worked fine in space on 5/28, allowing auto-translation from WS3 to WS2.]*

*Power Management Update:* Between 9:00-10:00am EDT, with the SPS (Secondary Power System) temporarily powered down, ground commanding transferred power loads on the 2B channel to the 2A channel via the MBSUs (Main Bus Switching Units) by means of SPCH (Seamless Power Channel Handover) as necessitated by the severe pointing limits of the 2B solar array at the upcoming high solar Beta angles until 6/8. *[This constraint, unique to the current 12A.1 stage configuration at very high Betas, leaves little power margin to support payload ops and other utilization needs for the next week. The 2B array will not be rotating during this time (i.e., is in Directed position), to reduce rotational wear on its BGA (Beta Gimbal Assembly) and to mitigate the plasma environment for EVA-19.]*

Today's CEO (Crew Earth Observation) photo targets were **Araguainha Impact Crater** (*ISS had an early morning pass in very likely clear conditions for this target. This 244 million year old impact is about 40km in diameter. However, due to its age, regional climate and land use, it is very difficult to spot even in Landsat imagery. The crew was to try for a two-minute mapping strip across this area using the 180mm lens settings and investigators will attempt to use this context view to better target future passes*), **Sao Paulo, Brazil** (*ISS had a near-nadir pass in fair weather over this Brazilian megacity situated in forested hills just inland from the coast. As the station approached from the NW, the crew was to acquire a detailed mapping of the urban margins, where growth and pattern changes can be detected from earlier imagery*), and **Iceberg A22A** (*best opportunities to acquire this challenging target based on lighting conditions and weather satellite imagery interpretation continue to be uplinked. The time of this pass was near nadir for the estimated position of the iceberg. Satellite imagery and trends indicate possible views through a broken to scattered cloud deck in low light*).

*[CEO Note: Today marks the beginning of the North Atlantic hurricane season. A very active season is forecast and during the coming months we will be requesting views of the storms as dynamic events with quick turnaround on the imagery. June through August is also the period of highest frequency for observing noctilucent clouds in the Northern Hemisphere. As participants in IPY (International Polar Year) ISS/CEO will also be monitoring the location and frequency of surface observations of this phenomenon in hopes of directing the crew to good views of them from the ISS. Finally, usually in June or July ISS daylight orbit tracks will parallel the terminator causing all nadir views to be in very low light. Sometimes three to five days will pass with no targets that meet minimal lighting conditions. This situation is expected to occur in the next 10 days.]*

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:38am EDT [= epoch]*):

Mean altitude -- 335.9 km  
Apogee height -- 341.2 km  
Perigee height -- 330.6 km  
Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.000795  
Solar Beta Angle -- 61.3 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude gain in the last 48 hours -- 160 m (*due to Russian EVA-18 venting*)  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48781

**Significant Events Ahead** (*all dates Eastern and subject to change*):

06/06/07 -- Russian EVA-19 (~10:30am, 6 hrs; 12 SMDPs, OpsLAN cable, BioRisk payload)  
06/08/07 -- STS-117/Atlantis/13A launch, 7:38pm (S3/S4 trusses)  
06/10/07 -- STS-117/Atlantis/13A docking (~3:38pm)  
06/11/07 -- EVA-1 (~2:53pm, 6.5 hrs)  
06/13/07 -- EVA-2 (~2:03pm, 6.5 hrs)  
06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)  
06/17/07 -- STS-117/Atlantis/13A undocking (~11:31am)  
06/19/07 -- STS-117/Atlantis/13A KSC landing (~2:44pm)  
07/13/07 -- FGB solar array retraction  
07/13/07 -- ESA ships ATV to Kourou  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- "Not earlier than" (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/18/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/20/07 -- (NET) STS-118/Endeavour/13A.1 landing  
08/21/07 -- Progress M-60/25P undocking (SM aft port) [*under review*]  
09/28/07 -- Soyuz TMA-10/14S relocation (to SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks [*under review*]  
10/20/07 -- (NET) STS-120/Discovery/10A docking  
10/22/07 -- (NET) Node 2 relocation  
10/29/07 -- (NET) STS-120/Discovery/10A undocking

11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V (Kourou, French Guyana)  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking (SM aft port)  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch *[to be reviewed]*  
12/13/07 -- (NET) STS-122 undocking  
12/14/07 -- Progress M-62/27P docking  
02/??/08 -- Russian EVA-20 *[to be reviewed]*  
02/12/08 -- Progress M-63/28P launch *[to be reviewed]*  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM  
ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking (from SM aft port)  
04/07/08 -- Progress M-63/28P undocking  
04/08/08 -- Soyuz TMA-12/16S launch  
04/10/08 -- Soyuz TMA-12/16S docking (SM aft port)  
04/19/08 -- Soyuz TMA-11/15S undocking (FGB nadir port)  
04/??/08 -- Soyuz TMA-12/16S relocation (to FGB nadir port)  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 05/31/07

**Date:** Thursday, May 31, 2007 2:23:39 PM

**Attachments:**

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### **ISS On-Orbit Status 05/31/07**

All ISS systems continue to function nominally, except those noted previously or below.

After last night's spacewalk, the crew's sleep cycle today remains shifted, for a short work/rest day. The station residents woke up at 10:30am EDT; bedtime will be at the regular 5:30pm this afternoon. The cycle will be back to regular tomorrow.

Yurchikhin and Kotov finished their EVA-18 spacewalk with complete success and even ~35 minutes ahead of schedule, despite a 45 minute delay before egress from the DC1 (Docking Compartment) airlock. Williams received special kudos for her outstanding support, including stunning TV imagery. *[With Fyodor and Oleg already isolated in DC1 and Suni in the FGB+U.S. segment, a still unidentified problem with the VHF S/G-2 (Space-to-Ground 2) comm channel was quickly solved by Suni by reopening the FGB/SM hatch and switching comm to S/G-1 at the SM comm control panel. After reclosing the FGB hatch at ~2:09pm, the obligatory hatch leak check had to be repeated, causing a 45 minute delay. Egress began with EVA hatch open at 3:05pm EDT. At ~5:49pm, Yurchikhin lost the mirror on his left Orlan arm, an object of 10 mm x 8 mm size and ~150 g mass (ballistics and possible EVA-19 impact currently being assessed). The excursion ended at 8:30pm, for a total duration (PET = Phase Elapsed Time) of 5h 25min (instead of 6 h), with all objectives accomplished. It was the 82<sup>nd</sup> spacewalk for ISS assembly & maintenance, the 54<sup>th</sup> from the station, the 21<sup>st</sup> from Pirs, the sixth for Tyurin and the first for Kotov. After today's spacewalk, 60 NASA astronauts, 17 Russians and eight astronauts representing Japan (1), Canada (2), France (1), Germany (1) and Sweden (3) have logged a total of 503 hrs 28 min outside the station on building, outfitting and servicing it.]*

EVA-18 accomplished all planned objectives, viz.:

1. Used the DC1-mounted GStM-2 "Strela-2" cargo boom/crane to transfer the

- 12A.1-delivered "Christmas Tree" stowage fixture with three SMDP (Service Module Debris Panel) bundles from the U.S. PMA-3 (Pressurized Mating Adapter 3) to temporary location on the SM (small diameter section),
2. Installed 5 SMDPs (1 bundle of 3) on circumferential handrails between small & large diameter section of the SM, and
3. Routed & connected an HF cable for the ASN-M (Satellite Navigation System/GPS) antenna from the DC1 to the SM aft end *[recovering the antenna's HF channel by replacing its damaged AFU feeder unit part with the "borrowed" HF channel part of the "Sputnik-SM" radio hardware.]*

After ingress, pre-EVA conditions were re-established for all station systems.

On today's short timeline, the FE-1 stowed the MO-9/Biochemical Urinalysis "Urolux" equipment used last night for the standard post-EVA test.

Afterwards, Kotov retrieved the ID-3 personal dosimeters from the spacesuit pockets and returned them to their permanent location on the Russian flight suits. Oleg also gathered the three "Pille-MKS" radiation sensors which he had deployed pre-EVA, took their readings and replaced them at their usual locations in the ASU toilet compartment and "Pille" kit pockets. Dosage values were transmitted to the ground.

FE-2 Williams unstowed and set up the hardware for her final NUTRITION experiment session, scheduled tomorrow and Saturday. *[The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing in-flight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will help to better understand the impact of countermeasures (exercise & pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current new NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI/Minus Eighty Degree Celsius Laboratory Freezer for ISS), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

CDR Yurchikhin performed another cabin atmosphere repress from the Progress M-60/25P air storage tank and afterwards supported the ground in activating the

Elektron oxygen (O<sub>2</sub>) generator at 32A. *[As usual, Fyodor monitored the external temperature of the Elektron's secondary purification unit (BD) for the first 10 minutes of operations to ensure no overheating, a standard precaution. During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Kotov and Williams assisted the ground in Phase 2 of the Canadian SSRMS (Space Station Remote Manipulator System) pre-launch checkout for 13A, configuring cameras and verifying SSRMS positions as the checkout proceeded from the usual pre-motion survey through two Joint OCAS (operator commanded auto sequence) maneuvers, first to an intermediate position, then to the final position for viewing the unberthing of the S3/S4 trusses during 13A. *[The maneuver could have been done with one Joint OCAS only but was split in two in order to satisfy the 13A pre-launch checkout requirement of mechanically driving each joint.]*

Sunita conducted the weekly 10-min. CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card, to be updated with today's data, lists 14 water containers (~420 liters total) for the four types of water identified on board: technical water (357.3 l, for Elektron, flushing, hygiene), potable water, condensate water, waste and other.]*

Oleg had 30 min set aside for OCA-downlinking images taken with the DCS 760 digital cameras during the EVA-10.

Fyodor will perform the daily routine maintenance of the SOZh (ECLSS) environmental control & life support systems in the SM, including ASU toilet facilities systems/replaceables.

With physical exercise reduced today, the crew is working out for one hour each (part of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1).

Afterwards, Sunita Williams copies the crew's exercise data file to the MEC (Medical Equipment Computer).

At ~12:00pm EDT, Suni configured up the SVG (Space Video Gateway) video converter/computer and connected it to a SONY PD100 camcorder for conducting, at 12:20pm, a PAO/educational TV event with students of the Central Islip School District, gathered at Central Islip High School, New York. *["Can you show us some*

*of the products you use to wash your hair or brush your teeth in space?"; "What do you do on the ISS for recreation?"; "When you're floating in space, do you ever get dizzy and can you perform a somersault for us?"; Why is it important to exercise in space and is it more fun to run a marathon on the ISS or on Earth?"; "Do you hope to someday publish a book about your experiences in space?"]*

At ~1:30pm, the FE-2 set up the SM's Kenwood amateur radio equipment and at 1:35pm held a ham session with educators gathered at a Teacher to Teacher Workshop at NASA JSC/Houston, TX. *[The two-day Workshop is sponsored by the U.S. Department of Education and NASA, with about 300 K-12 educators from around the nation participating, focused on science, technology, engineering, and mathematics (STEM). The objective is to make teachers aware of the unique opportunities that NASA education offers to enhance curriculum and inspire students in STEM careers. "Can you describe your daily routine or activities?"; "What impact do you think the ISS will have on the education of America's youth and students around the world?"; "How did math help you to be an astronaut?"; "Do you experience air- or motion-sickness?"; Can you explain one exciting thing that you learned and didn't expect onboard the ISS?"]*

*13A Software Loading Update: During a 2.5 h period starting at 10:08am, MCC-H upgraded the EXT MDMs (Multiplexer/Demultiplexer computers) with new software files via PPLs (Pre-Positioned Loads), needed in preparation for the 13A mission. Each of the two EXT MDMs was first transitioned to backup (i.e., swapped), before being loaded with the files to EEPROM (electronically erasable programmable memory), then being reinitialized from there. [A similar 13A upgrade will be performed 6/4 on the P3 truss segment MDMs, requiring transition to Diagnostics mode. The P3 MDMs are controlling the SARJ (Solar Alpha Rotary Joint).]*

Today's CEO (Crew Earth Observation) photo target was **Iceberg A22a, South Atlantic** *(scientific interest remains high. There were more openings between cloud masses today than there were yesterday. Looking left of track. The iceberg is part of a study [funded by the National Science Foundation] to see what icebergs can tell us about the response of ice sheets to climate change. As large Antarctic icebergs drift into warmer latitudes they undergo a time-compressed and intense 'climate-change.' Processes that usually require decades occur in only months or a few years. The spectacular Antarctic ice shelf break-ups of 2002, and similar, smaller events in Greenland, are illustrated repeatedly by drifting bergs like A22a.)*

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<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** *(all dates Eastern and subject to change):*

06/06/07 -- Russian EVA-19 (~10:30am, 6 hrs; 12 SMDPs, OpsLAN cable, BioRisk payload)  
06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch, 7:38pm (S3/S4 trusses)  
06/10/07 -- (NET) STS-117/Atlantis/13A docking (~3:38pm)  
06/11/07 -- EVA-1 (~2:53pm, 6.5 hrs)  
06/13/07 -- EVA-2 (~2:03pm, 6.5 hrs)  
06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)  
06/17/07 -- (NET) STS-117/Atlantis/13A undocking (~11:31am)  
06/19/07 -- (NET) STS-117/Atlantis/13A KSC landing (~2:44pm)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/21/07 -- Progress M-60/25P undocking (SM aft port)  
08/23/07 -- (NET) STS-118/Endeavour/13A.1 landing  
09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking

02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/30/07  
**Date:** Wednesday, May 30, 2007 3:13:33 PM  
**Attachments:**

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### **ISS On-Orbit Status 05/30/07**

All ISS systems continue to function nominally, except those noted previously or below. ***EVA-18 is underway as of 3:05pm EDT.***

After a 4h 20m sleep cycle shift, workday began today at 6:20am EDT, extending through 1:00am tomorrow morning. *[Wake-up is then set for 10:30am and sleep period will start tomorrow at a shifted 5:30pm, until the regular 2:00am.]*

After morning inspection, all pre-EVA activities have proceeded smoothly and on schedule, starting out with Yurchikhin and Kotov taking another MO-9 "Urolux" urine biochemistry test before breakfast. *[A second session with the Urolux equipment will be conducted by both crewmembers tonight (~9:20pm) immediately after post-EVA station repress.]*

FE-2 Williams supported the preparations by hooking up the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable at the RWS (Robotics Work Station) and powered up the Cupola PCS (Portable Computer System) laptop in support of this afternoon's video coverage of the EVA and tomorrow's planned 13A pre-launch Robotics checkout activities.

Afterwards, Sunita had several hours to configure ISS systems for the spacewalk by

- Ensuring the Sputnik-SM ham radio equipment (Kenwood-D700 transceiver is deactivated,
- Changing settings of the DSD pressure alarm sensor,
- Deactivating a DS-7A Smoke Detector in the SM PkhO (Service Module Transfer Compartment),
- Setting up the PSS Caution & Warning System in the FGB,
- Turning off two fans (VP1,2) for CO<sub>2</sub> absorption,

- Removing SM air ducts to enable RO-PkhO hatch closure,
- Deactivating VN1 air heaters and VK1 fans,
- Closing external protective shutters of SM windows #6, #8, #12, #13, #14,
- Shutting down the SRV-K2M condensate water processor (after SKV-2 air conditioner had been turned off), and
- Powering off the electrical food heaters in the galley.

As part of preparations, Williams also opened the overhead hatch MPEV (Manual Pressure Equalization Valve) in the Node (with muffler installed), then readied the Kodak DCS 760 EVA cameras, before turning them over to the spacewalkers.

CDR Yurchikhin and FE-1 Kotov had about an hour reserved to complete setting up DC1 (Docking Compartment) and PkhO systems for pre-EVA mode.

Next steps by Fyodor and Oleg were to (a) check out the Orlan-M spacesuits and their systems as well as the suit interface control panels (BSS) in DC1 & PkhO, (b) retest the BK-3 primary & backup oxygen (O<sub>2</sub>) tanks of the Orlans and DC1, (c) disassemble the DC1 air duct, but leaving the V3 fan in place, and (d) set up the communications links necessary for the spacewalk from the DC1. *[Most activities were paced by RGS (Russian ground site) comm window passes.]*

After a midday meal (10:15-10:55am), the spacewalkers, assisted by Sunita, conducted final inspection of the suits, BSS interface units & biomedical parameter telemetry to RGS (~11:10am), including VHF/voice & biomedical electrode belt and telemetry hookups via the BSS (later by the wireless in-suit Tranzit-B radio telemetry system) for vital signs and equipment monitoring.

Yurchikhin and Kotov donned the Orlans and ancillary gear at ~12:10pm, assisted by Williams, followed by closing the hatchways between SM RO/PkhO (Working Compartment/Transfer Compartment) and PkhO/SU (DC1 Transfer Vestibule) at ~12:40pm, then sealing the Orlan backpacks (~12:50pm), plus subsequent Orlan and BSS controls checks. Final checkout of suits and their controls included checking for leak during successive stages of depressurization. *[Pressure inside the Orlans was reduced to 0.42 at (6.2 psi). After suit purge, the spacewalkers had a 30-minute oxygen prebreathe period, as pressures between DC-1 and the PkhO were equalized and then further reduced.]*

Sunita Williams at first remained in PkhO and later (~1:26pm) also closed the hatch between the FGB PGO (Instrumentation Cargo Compartment) and the SM, staying in the FGB+USOS. However, at that point an RF S/G (space-to-ground) comm problem **stopped activities by about 40 minutes** and required the FE-2 to reenter the SM to check and modify settings at the SM radio console. Sunita again closed

the FGB/SM hatch at 2:09pm, followed by a hatch leak check and subsequent opening of the PEV (pressure equalization valve) to the SM).

A final leak check was conducted of the four BK-3 O<sub>2</sub> tanks. At end of prebreathe, DC1 pressure was down to 15 mmHg (Torr), holding for 5 min for a final cabin leak check, followed by switching the Orland to autonomous (battery) suit power (~3:00pm) and opening of EV hatch #1 at 3:05:35pm.

The spacewalk by Yurchikhin (EV1) and Kotov (EV2) from DC1 should last an estimated 6h (unless suit consumables like LiOH, impacted by the delay, stipulate an earlier return). Nominal EVA-18 objectives are:

1. Use of the DC1-mounted GStM-2 "Strela-2" cargo boom/crane to transfer a 12A.1-delivered stowage fixture ("christmas tree") with three bundles of SMDPs (Service Module Debris Panels) from the U.S. PMA-3 (Pressurized Mating Adapter 3) to temporary location on the SM (small diameter section),
2. Install 5 SMDPs (1 bundle of 3) on circumferential handrails between small & large diameter section of the SM, and
3. Route & connect an HF cable for the ASN-M (Satellite Navigation System/ GPS) antenna from the DC1 to the SM aft end *[to recover the antenna's HF channel by replacing its damaged AFU feeder unit part with the "borrowed" HF channel part of the "Sputnik-SM" radio hardware.]*

After return and ingress from the EVA, with DC1 airlock repressurization from SM cabin air, the crew will open hatches and reenter the SM for their second MO-9 "Urolux" biochemical urine test.

This will be followed by the crew resetting communications, conducting ISS activation operations and restoring systems configurations in the DC1 and other RS modules to pre-EVA conditions, then installing the DC1 air ducts.

Williams will return ISS systems to their initial states, including air ducts, Vozdukh CO<sub>2</sub> scrubber and Sputnik-SM amateur radio.

During the EVA, Sunita was to work for some time in the U.S. Airlock (A/L), terminating charging of the first set of EMU batteries in the BSA (Battery Stowage Assembly) for the 13A EVAs and starting it on the second batch. Subsequently, Sunita will take documentary photographs of the A/L interior.

Later, Sunita has three hours allocated for prepacking hardware slated for return on 13A/Atlantis plus another hour to continue her own departure preparations. *[During the next two weeks, Sunita's daily workloads are reduced to allow her time to prepare for her return.]*

Today's CEO (Crew Earth Observation) photo targets were **Araguainha Impact Crater, Brazil** (*aiming left of track for this 40 km-diameter crater. The crater is partly vegetated. Visual cues are two margins of farmland, with the crater lying in the angle between*), **Iceberg A22A, South Atlantic** (*conditions were expected to be marginal for spotting this target because light is low [only 18 degree sun elevation] and weather satellite imagery suggested, at best, some breaks in the clouds. Looking slightly left of track and using the long lens settings and search for a feature with generally less texture and shadow than the clouds. Numerous cloud fragments may have been in the vicinity*), and **Manila, Philippines** (*nadir pass. Greater Manila has a population of 11.3 million, making it the 24<sup>th</sup> largest city in the world. With in-migration of workers from surrounding areas, the city swells to more than 14 million during the day*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
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**ISS Orbit** (*as of this morning, 7:15am EDT [= epoch]*):

Mean altitude -- 335.7 km

Apogee height -- 340.9 km

Perigee height -- 330.6 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007682

Solar Beta Angle -- 52.6 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 39 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48797

**Significant Events Ahead** (*all dates Eastern and subject to change*):

06/06/07 -- Russian EVA-19 (~10:30am, 6 hrs; SMDPs, OpsLAN, BioRisk)

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch, 7:38pm (S3/S4 trusses)

06/10/07 -- (NET) STS-117/Atlantis/13A docking (~3:38pm)

06/11/07 -- EVA-1 (~2:53pm, 6.5 hrs)

06/13/07 -- EVA-2 (~2:03pm, 6.5 hrs)

06/15/07 -- EVA-3 (~1:33pm, 6.5 hrs)

06/17/07 -- (NET) STS-117/Atlantis/13A undocking (~11:31am)

06/19/07 -- (NET) STS-117/Atlantis/13A KSC landing (~2:44pm)

07/13/07 -- FGB solar array retraction  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir, for 10A Node 2 install)  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/21/07 -- Progress M-60/25P undocking (SM aft port)  
08/23/07 -- (NET) STS-118/Endeavour/13A.1 landing  
09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/13/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/29/07  
**Date:** Tuesday, May 29, 2007 12:49:01 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 05/29/07**

All ISS systems continue to function nominally, except those noted previously or below. *The crew has half a day off for resting before the spacewalk on 5/30.*

In preparation for tomorrow's Orlan EVA-18, the crew conducted a 1.5 hr review of the EVA timeline and tagup with ground specialists via S-band. *[The spacewalk by Yurchikhin (EV1) and Kotov (EV2) from DC1, estimated at 6 hrs duration, will begin at 2:26pm EDT (EV hatch opening, timed by RGS/Russian Ground Site acquisition and orbital sunrise at ~2:23pm) and last until an estimated ~8:26pm (hatch closing). After egress, the crew will experience three orbital nights and ingress after a fourth sunset (8:12pm). EVA-18 objectives are: (1) Use of the GStM-2 "Strela-2" cargo boom/crane to transfer a stowage platform with 17 SMDP (Service Module Debris Panels) from the USOS PMA-3 (Pressurized Mating Adapter 3) to temporary SM position and partial SMDP installation (Bundle #4) for micrometeoroid protection, and (2) routing & connecting an HF cable for the ASN-M (Satellite Navigation System) antenna from the DC1 to the SM aft end. With FE-2 Williams in the SM PkhO (Transfer Compartment), closing of hatches between PkhO & SM RO (Work Compartment) and between PkhO & DC1 will be at ~12:40pm, followed by suit donning, preliminary & final leak checks of suits, BSS and hatches, passageway closing between the SM & FGB PGO (Instrumentation Cargo Compartment) by Sunita at ~1:25pm, staged depressurization of DC1 with crew prebreathing, Orlan transition to autonomous battery power and EVA hatch opening at ~2:26pm for egress.]*

CDR Yurchikhin set up and prepared CCPKs (Crew Contamination Protection Kits; Russian: PNST), intended to protect the spacewalkers from FORP (Fuel/Oxidizer Reaction Products, e.g., N-nitrosodimethylamine, NDMA), i.e., incompletely-burnt fuel residue on the SM hull from yaw/pitch thruster plumes. *[Protective gear kits for use during and after the EVA in case the Orlans are inadvertently contaminated, are extensively equipped with wet wipes, dry towels, goggles, IPK gas masks and half*

*masks, latex gloves, high performance filters, trash containers, etc. The crew today reviewed detailed instructions what to do if any spacesuit contamination is detected after the EVA. Towels used for wiping gloves etc. will be thrown overboard in retrograde direction (i.e., against flight direction).]*

Also in preparation of the spacewalk, FE-1 Kotov worked in the Soyuz TMA-10/14S spacecraft, docked at the FGB nadir port, to activate its ASU toilet facilities (for use by FE-2 during the spacewalk).

FE-2 Williams prepared the Orlan DIDBs (disposable in-suit drink bags), after they had time to dry from yesterday's suited translation exercise, by filling them with fresh water and installing them in the suits.

Suni also initiated charging two batteries for the Kodak DCS 760 EVA camera and later set up the camera for operation.

Meanwhile, Kotov retrieved three Russian "Pille-MKS" radiation dosimeters, recorded their dosages and equipped each Orlan (in pocket on left calf) with a radiation sensor (A0309 & A0310). *[A third sensor, A0307, will be placed in the SM for background readings, and a fourth, A0308, is on standby. Also, Oleg transferred the ID-3 personal dosimeters, normally worn on the flight suit, to the chest pocket of the Orlan's lining (near the DIDB), later to be returned to the flight suits. On 5/31, after the EVA, readings from all dosimeters will be recorded and downlinked.]*

Oleg also broke out and set up the equipment for tomorrow's planned "Urolux" biochemical urine test (PZE MO-9). *[MO-9 is conducted regularly every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for US crewmembers for IMG (Integrated Medical Group) PHS evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. The data are then entered in the Medical Equipment Computer (MEC)'s special IFEP software (In-Flight Examination Program).]*

FE-2 Williams conducted a 30-min teleconference with EVA specialists at MCC-H via S-band/audio, discussing particulars of the upcoming 13A spacewalks.

Later, Sunita had some time reserved to continue her return-to-Earth preparations, focusing today on half-CTBs (Cargo Transfer Bags) with U.S. clothing and personal items in her TeSS (Temporary Sleep Station) in the Lab. During the next two weeks, Suni's daily workloads will be reduced to allow her time to prepare for her return.

Fyodor Yurchikhin completed the periodic (about twice a month) replenishing of the

Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with purified water from CWC (Contingency Water Container) collected by the U.S. CCAA (Common Cabin Air Assembly). *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Sunita conducted the routine status checkup and filter inspection of the running CSI-4/5 (CGBA Science Insert 4/5) payload of seed germination modules and nematode worms housed in the CGBA (Commercial Generic Bioprocessing Apparatus) incubator. *[The incubator is controlled from the ground with automatic video downlinked to Earth. Students in the U.S. and Malaysia are participating in educational activities in their classrooms while monitoring the growth in orbit.]*

The CDR performed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including ASU toilet facilities systems/replaceables.

The FE-1 worked on the IMS (Inventory Management System) standard "delta file", updating/editing it for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew completed their daily regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive "weight-lifting" exerciser (FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

Later, FE-2 will copy the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The cabin atmosphere was repressurized for an hour with air from Progress M-60/25P tankage to adjust total pressure.

At ~3:20am, Sunita Williams powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 3:25am conducted a ham session with students at EFLS Sainte-Marie SUARLEE, Suarlee (formerly known as Abbaye Saint Gerard de Brogne, Saint-Gerard [Mettet]), Belgium. *[The Sainte Marie School is located in Suarlee, a village in Wallonia, the French speaking region of Belgium. "If you had to return to Earth for some reason, how quickly could you do it?"; "What do you think about space tourism? Is it going to slow down your work?"; "How do you keep up with the different time zones? What time is it currently aboard the ISS"; "What are the*

*benefits of having female crewmembers on ISS?"]*

After the amateur radio session, Suni powered down the Kenwood ham radio equipment in SM to prevent RF interference with the Orlan "Tranzit" system during the spacewalk.

At ~4:00am, MCC-H activated the Airlock CCAA THC (Common Cabin Air Assembly/Temperature & Humidity Controller) for 6 hrs to remove moisture off the HX (heat exchanger) that has collected over the last 7 days.

At ~10:30am, the P3-1 and P3-2 MDMs (Multiplexer/Demultiplexers, computers) were transitioned by the ground to Diagnostics mode to support uplink of a PPL (Pre-Positioned Load) for defining new SARJ (Solar Alpha Rotary Joint) control operational parameters for STS-117/13A. *[During the upload, the port SARJ was feathered (not locked) at 90 deg, later returned to autotrack.]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 6:55am EDT [= epoch]):*

Mean altitude -- 335.8 km

Apogee height -- 340.8 km

Perigee height -- 330.7 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007534

Solar Beta Angle -- 47.8 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 88 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48781

**Significant Events Ahead** *(all dates Eastern and subject to change):*

05/30/07 -- Russian EVA-18 (~2:26pm EDT, 6 hrs; SMDPs, ASN-M HF cable)

06/06/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

06/10/07 -- (NET) STS-117/Atlantis/13A docking

06/17/07 -- (NET) STS-117/Atlantis/13A undocking

07/13/07 -- FGB solar array retraction  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir for 10A Node 2 install))  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/21/07 -- Progress M-60/25P undocking (SM aft port)  
08/23/07 -- (NET) STS-118/Endeavour/13A.1 landing  
09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1) & reentry  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/28/07  
**Date:** Monday, May 28, 2007 2:20:23 PM  
**Attachments:**

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### **ISS On-Orbit Status 05/28/07**

All ISS systems continue to function nominally, except those noted previously or below. *Memorial Day – a time to reflect. Underway: Week 6 of Increment 15.*

After their physical exercise sessions (reduced to 1.5h each) and one-hour midday break (~8:10am EDT), CDR Yurchikhin and FE-1 Kotov proceeded with today's planned suited Orlan-suited dry-run exercise, beginning with disassembly and removal of the air duct between the SM PkhO (Service Module Transfer Compartment) and the DC1 (Docking Compartment), to gain room for the suited translation exercises, leaving ventilation fan V3 in.

With the communications links configured via the suits' radio telemetry units, the two spacewalkers checked out the Orlan suits, their equipment and BSS interface units via USI data output device. *[All EVA preps were monitored by the ground via S-Band and VHF.]*

Donning of EVA gear began at ~10:00am, starting with checkout of the comm hookups & biomedical parameter telemetry via BSS and equipment monitoring, then culminating in complete ingress in the Orlans at ~11:00am and closure of backpacks. *[The suited run required wireless Tranzit-B suit radio comm and temporary deactivation of the Russian VHF channel 1 (Very High Frequency, Russian: UKV1, for ultra-shortwave) to avoid interference from extraneous radio stations to the Orlans while over Russian ground stations (RGS). All EVA preps were monitored by the ground via audio.]*

DC1 hatch closing (isolation) and start of partial depress for subsequent leak checks was timelined at ~11:15am, followed by functionality checkout of the suits and their BSS controls, preliminary fit checks at 0.4 atm (5.9 psi) suit pressure, and 75 minutes of testing/training of suited mobility & translation. *[The suited mobility & translation exercises began around 11:40am. They included moving to VL1 (EVA*

*hatch #1), translating to the EVA support panel (POV) and BSS, checking out rotation capability with and without lights on, retrieving the camera from the KPU tool carrier and stowing it temporarily on the Orlan swing arm, then removing it, retrieving the SMDP (SM Debris Panel) tool from the crewlock bag and placing it in a trash bag on the swing arm, then stowing it in the tool caddy, moving payload bundles, and operating with OTAs (Orlan tether assemblies).]*

Orlan egress was timed for ~12:55pm, followed by a 2h 20m period of post-training cleanup activities. *[These include changing clothes, drying out LCG (liquid cooling garment), biomed harness belt, thermal undergarment, socks, comfort gloves, hygienic trunks and comm caps, removing LiOH canister and moisture collector, etc., restoration of communications settings to nominal operation, and re-installation of the air duct between SM PkhO and DC1.]*

Subsequently, after the Orlans were confirmed to be dry, they are to be re-equipped with fresh consumables/replaceable elements for the spacewalk on Wednesday (5/30).

FE-2 Williams meanwhile worked a list of tasks of her own, starting with more “get-ahead” preparations for next month’s STS-117/13A spacewalks by working in the “Quest” Airlock (A/L) where she set up and performed the periodic scrubbing of the EMU (Extravehicular Mobility Unit) and A/L cooling water loops, including their iodination and particulate filtration. The activity, performed on two suits (#3006, #3018) simultaneously, required two hours. *[Purpose of the periodic scrubbing, including iodination for biocidal maintenance, is the elimination of any biomass and particulate matter that may have accumulated in the loops.]*

Also in the A/L, Sunita initiated the recharge process on the new EMU batteries in the BSA (Battery Storage Assembly).

Williams had an hour reserved for reviewing uplinked procedures for the 13A spacewalks.

Another hour was set aside for Suni for more preparations for her return on 13A/Atlantis.

Servicing the SM toilet system (ASU), the FE-2 replaced the wring collector (SOT), a gas separator used only for contingency, with a new unit, discarding the old one as trash.

Working off the Russian voluntary “if time permits” task list, Fyodor and Oleg were to update/edit the IMS (Inventory Management System) standard “delta file” for the regular weekly automated export/import to the three IMS databases on the ground

(Houston, Moscow, Baikonur).

The crew worked out on their physical exercise program, with “time off” for CDR and FE-12 for their dry run, on the TVIS treadmill (CDR/1.5h, FE-1/1.5h, FE-2), and RED resistive exerciser (FE-2).

Afterwards, FE-2 copies the crew’s exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

In preparation for 13A, after an SSRMS (Space Station Remote Manipulator System) video survey of the rail translation path, the MT (Mobile Transporter) was ground-commanded to roll from Workstation 4 (WS4) to WS2 between ~8:30-11:00am EDT, using string A MBS IMCAS (Mobile Base System/Integrated Motor Controller Assemblies) powered from the 4B array. *[For the translation, Russian thrusters were temporarily inhibited (9:30-11:00am) due to MT loads constraints.]*

*“Saturday Science” Update:* Sunita has received three options for the next voluntary “Saturday Science” program on 6/2, at her choice: (a) CFE-VG2 (Capillary Flow Experiment – Vane Gap 2), the fourth investigation of this experiment; the run is motivated by new science (i.e., a new meta-stable condition) discovered during the previous run, thought to be the last at that time; (b) EPO (Education Payload Operations) – On-Orbit Hobbies, with the crew discussing some of their favorite hobbies while on the ISS (can be combined with Option c); (c) EPO - Living Area Tour, a simple visual tour of crewmember's personal space, to be used to produce a video program for students. Suni is to downlink her acceptance and preferences by tomorrow night.

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Revolutions since FGB/Zarya launch (Nov. 98) -- 48766

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/30/07 -- Russian EVA-18 (~2:20pm EDT, 6 hrs; SMDPs, ASN-M HF cable)  
06/06/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)  
06/10/07 -- (NET) STS-117/Atlantis/13A docking  
06/17/07 -- (NET) STS-117/Atlantis/13A undocking  
07/13/07 -- FGB solar array retraction  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir for 10A Node 2 install))  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/21/07 -- Progress M-60/25P undocking (SM aft port)  
08/23/07 -- (NET) STS-118/Endeavour/13A.1 landing  
09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking

02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/27/07  
**Date:** Sunday, May 27, 2007 12:47:00 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 05/27/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Sunita Williams). Day 169 in space for Suni (launched 12/9/06 on STS-116). Ahead: Week 6 of Increment 15.*

The CDR conducted today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM) and the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Yurchikhin also gathered data on total operating time & ON durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM's SOGS air revitalization subsystem for reporting to TsUP.

The FE-1 meanwhile performed the periodic (monthly) maintenance work on the SM toilet system (ASU) by changing out major components, followed by an ASU checkout. *[Replaced with new units were the U-receptacle (MP) and filter insert (F-V) on the KTO solid waste container (not replaced). The old items were logged in the IMS (Inventory Management System) database and stowed for disposal. (Last time done: 4/27).]*

Fyodor downlinked, via Ku-band, the video of the Progress 24P-to-DC1 docking interface shot last week (5/24) just before hatches closure, for ground inspection.

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

At ~10:40am EDT, Sunita held a PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

Working off the Russian "time permitting" task list, Oleg completed another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Sony PD-150P camcorder from SM window #7 to obtain photographic data for evaluation of seasonality impacts on bio-production processes through water areas of the West Pacific Ocean and of the North-West, Central and South-East Atlantic Ocean. *[Objects to be imaged were sea ice, color-contrast bodies in the ocean waters, coral islands and reefs, dramatic changes in the nebulosity structure, traces of water and air mass turbulences, level surface anomalies, smooth zones within wave fields. Photo targets were St. Lawrence Bay, Africa West Shelf water area, and the coast of the Republic of South Africa in the Atlantic Ocean, plus the coast of Hokkaido Island and the waters of the Polynesia island world in the Pacific.]*

*EMCH Wrap-up: POIC to Suni: "The EMCH (Elastic Memory Composite Hinge) team is very pleased with the science gained during the final set of operations yesterday. These operations finished the repeatability performance data testing on our TEMBO® EMC Hinges. Specifically, test ID 12 completed our baseline test plan and the repetition of test ID's 6 & 7 further demonstrated the functionality of the TEMBO® EMC hinge in the worst case off-nominal deployment conditions. Now all of our experimental goals have been successfully achieved. Many thanks for the great support and execution of this experiment."*

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:45am EDT [= epoch]):

Mean altitude -- 335.9 km

Apogee height -- 341.2 km

Perigee height -- 330.7 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0007859

Solar Beta Angle -- 38.0 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48750

**Significant Events Ahead** *(all dates Eastern and subject to change):*

05/28/07 -- Orlan suited dry-run

05/30/07 -- Russian EVA-18 (~2:20pm EDT, 6 hrs; SMDPs, ASN-M HF cable)

06/06/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

06/10/07 -- (NET) STS-117/Atlantis/13A docking

06/17/07 -- (NET) STS-117/Atlantis/13A undocking

07/13/07 -- FGB solar array retraction

07/20/07 -- US EVA-9

07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir for 10A Node 2 install))

08/05/07 -- Progress M-59/24P undocking (DC1) & reentry

08/06/07 -- Progress M-61/26P launch

08/08/07 -- Progress M-61/26P docking (DC1)

08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking

08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking

08/21/07 -- Progress M-60/25P undocking (SM aft port)

08/23/07 -- (NET) STS-118/Endeavour/13A.1 landing

09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15 launch

10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)

10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing

10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks

10/22/07 -- (NET) STS-120/Discovery/10A docking

10/24/07 -- (NET) Node 2 relocation

10/31/07 -- (NET) STS-120/Discovery/10A undocking

11/06/07 -- US EVA-10

11/14/07 -- US EVA-11

11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V

11/20/07 -- US EVA-12

12/02/07 -- ATV-1 docking

12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- (NET) STS-122/Atlantis/1E docking

12/12/07 -- Progress M-62/27P launch

12/14/07 -- Progress M-62/27P docking

12/15/07 -- (NET) STS-122 undocking

02/12/08 -- Progress M-63/28P launch

02/14/08 -- Progress M-63/28P docking

02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/26/07  
**Date:** Saturday, May 26, 2007 3:31:56 PM  
**Attachments:**

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### **ISS On-Orbit Status 05/26/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 15 crew CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Sunita Williams, except for regular maintenance & voluntary work. Day 168 in space for Suni (launched 12/9/06 on STS-116).*

The workday started off for Yurchikhin and Kotov with a review of EVA procedure specifics and a teleconference with ground specialists at ~3:30am EDT.

Afterwards, the crew conducted the regular weekly 3-hr task of thorough station cleaning, today with an additional disinfection using Fungistat solution in the SM RO (Service Module Working Compartment) near panels 139 and 452 where soiling and residue were found. *["Uborka", done routinely on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the SM dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station, normally with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

For today's "Saturday Science" activity, Williams conducted another session with the EMCH (Elastic Memory Composite Hinge) experiment, the final three runs of 14 prior to return. The experiment studies the performance of an advanced type of composite hinge to determine its suitability for use in space. Activities consisted of activating the payload and conducting operations using hinge assemblies 1, 2 and 3. *[Elastic memory technology may eliminate the need for highly complex deployment mechanisms in spacecraft structures by providing a simpler, lightweight alternative. The Air Force Research Laboratory (AFRL) experiment uses six elastic memory hinges made from a unique resin and carbon fiber laminate, moving an attached mass at one end and measuring force & torque on the hinge plus the*

*accuracy of deployment. The hinges were folded on the ground for deployment in space. A resistive heater, embedded in the EMC laminates in the hinge, provides the heat necessary for actuation, requiring 12 watts of power for 2-3 minutes. A proximity sensor attached at the end mass determines the final position upon deployment. A second motion sensor measures the deployment vs. time history. Sunita's job was to apply power to the experiment, wait for the hinges to reach the appropriate temperature and then activate each hinge individually. Video and photo documentation of deployments was required. The test articles are re-settable (with heat) to allow for multiple deployments.]*

Kotov turned off the gas analyzer (GA) in the Soyuz TMA-10 spacecraft which has been active since 4/17.

Sunita completed the regular FFQ (Food Frequency Questionnaire), her 22<sup>nd</sup>, on the MEC (Medical Equipment Computer). *[By means of these FFQs, U.S. astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

At ~8:45am EDT, the crew conducted their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Suni performed the daily routine maintenance of the SOZh (ECLSS) environmental control & life support systems in the SM, including ASU toilet facilities systems/replaceables.

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

Later today, FE-2 will copy the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~6:30am, Williams had her weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

At 4:00pm, the crew is scheduled to downlink a TV message of congratulations to Inessa Kozlovskaya, Professor of Sensor Physiology & Preventive Care at IMBP (Institute of Medico-Biological Problems) in Moscow on the occasion of her 80<sup>th</sup> birthday. *[Happy Birthday, Inessa Benediktovna!]*

Working off the Russian voluntary task list, CDR Yurchikhin conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature. *[Today's Uragan photo targets were the Mt. Etna volcano and the Isle of Sicily, the City of Houston, the State of California, and Patagonian glaciers.]*

*RED Update:* Yesterday, Sunita completed the scheduled replacement of Flexpack assemblies of the Resistive Exercise Device canisters, after which the unit was successfully calibrated. Ground engineers have given a Go for nominal RED exercise based on the observed calibration data. *[However, loading constraints will continue to be imposed to avoid exceeding certified loads on the unit (the cords are only certified to a maximum load of 150 lbs each).]*

### **Weekly Science Update** (*Expedition Fifteen -- 5<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* During data downlink activity on 5/17, crew reported the memory card to be empty, although LEDs and connections were reported ok. On 5/19, upon another check by the crew, it was concluded that the specific memory card was not recording properly. The memory card was replaced and ever since, ALTCRISS has been performing nominally.

*ANITA:* Planned.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2:* CARDIOCOG-2 session was performed nominally on 5/22. Data will be assessed by the science team upon receipt.

*CFE (Capillary Flow Experiment):* All nominal operations for CFE-ICF2 experiment were completed. During this experiment several methods were employed to create bubbles in the test fluid and then position the fluid within the container to observe the global capillary-driven migration of the fluid. During such flows, the geometry of the container provided a passive means for separation and coalescence of the bubbles—a desirable capability for certain fluid systems aboard spacecraft.

Agitating the fluid to the point of forming foam was not possible as demonstrated by Suni, nor was generating a bubbly solution and injecting it onto the test cell. This is

attributable to the fact the fluid is pure and without significant surfactants.

Nonetheless, significantly bubbly flows were generated by Suni who managed also to position the bulk liquid in the correct manner for numerous experiments that successfully, repeatedly, and quantitatively demonstrated simultaneous bulk fluid migration and passive phase separation.

*CHROMOSOME-2 (E14 SFP):* Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* Malaysian students will be starting their analysis of the *C.elegans* images in the next two weeks. The images have already been analyzed by US and Canadian students but it took a while longer for the Malaysian schools to come up to speed with their on-line access. There will be 50 schools in Malaysia participating

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* In support for BCAT-3 only.

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Complete.

*EMCH (Elastic Memory Composite Hinge):* "The success of EMCH is truly out of this world. EMCH success on ISS has generated interest and considerations from TDRS, ISS re-supply missions, Lunar communications systems, DOD missions Operational Responsive Space, and future commercial antenna systems providing for example, 'Internet in the sky'"

*EPO (Educational Payload Operation) Kit C:* Planned.

*IMMUNO (Saliva Sampling):* Planned.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*MULTIGEN-1:* Planned

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* Planned.

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* NOA pouch has not been located yet. Under investigation by Russian team. This pouch needs to be located before the next Russian EVA, planned on 5/30.

*NUTRITION:* Planned.

*SAMPLE:* Science team confirmed the freezing of SAMPLE samples of the first crew sampling session.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* This week Suni successfully completed her last Sleep download. She will have her last scheduled sleep logging for the week of 6/3-6/9. She will also have a doff activity before leaving. The Ops team thanked her for all the on-orbit help.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* In progress.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 5/17 the ground has received a total of 2,545 CEO images for review and cataloging for Increment 15. Target acquisitions identified this week are: The Kara-Kul Impact Crater, Tajikistan; the Tenoumer Impact Crater, Mauritania, and the Arkenu Impact, Libya. Daylight-awake orbit tracks are shifting to Southern Hemisphere now where targets are fewer and winter weather and lighting conditions combine to make both the ground's target selection and the crew's target acquisition challenging tasks. "Actually observing and photographic ocean features such as icebergs and plankton blooms between storm clouds and low light will be a matter of luck and patience. Thank you for your continued efforts."

Today's CEO (Crew Earth Observation) photo targets were **Mt. Etna volcano** (*Dynamic event. Smoke and steam may be rising from this Sicilian volcano, left of track, on the NE corner of the island*), **Lake Nasser, Toshka Lakes, Egypt** (*shots under track, to document water levels, were requested. Images of shorelines provide the greatest amount of water-level information*), **Santa Barbara Coast, California** (*the crew was to shoot the mainland coastline in a mapping pass for*

about 45 secs. Ecological changes around major urban centers are being monitored as part of the LTER [Long Term Ecological Research] collaboration with more than 1000 scientists and students and many sites worldwide), **Iceberg A22a, South Atlantic Ocean** (IPY—Iceberg. IPY—Iceberg A22a. There is high scientific interest in acquiring images of this massive iceberg as it breaks up in the South Atlantic Ocean. The massive A22a iceberg is still 35 km long. It drifted free of Antarctica two years ago from a point in the Weddell Sea. It is in the process of rapid breakup. Despite low light and scattered cloud, researchers requested the crew to attempt to image this feature, looking left of track. There is high science interest in this feature as part of IPY [International Polar Year] activities), and **Jarvis Island, equatorial Pacific** (looking left of track ~1.5 degrees. The crew was to image the coral reef that fringes this small atoll for the worldwide study of these “living” geological formations).

CEO photography can be viewed and studied at the websites:

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<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this noon, 12:02pm EDT [= epoch]):

Mean altitude -- 336.0 km

Apogee height -- 341.4 km

Perigee height -- 330.6 km

Period -- 91.26 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008097

Solar Beta Angle -- 33.1 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 140 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48737

**Significant Events Ahead** (all dates Eastern and subject to change):

05/24/07 -- EVA-18 Readiness Review (JSC)

05/28/07 -- Orlan suited dry-run

05/30/07 -- Russian EVA-18 (~2:20pm EDT, 6 hrs; SMDPs, ASN-M HF cable)

06/06/07 -- Russian EVA-19

06/08/07 -- “Not earlier than” (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

06/10/07 -- (NET) STS-117/Atlantis/13A docking

06/17/07 -- (NET) STS-117/Atlantis/13A undocking

07/13/07 -- FGB solar array retraction

07/20/07 -- US EVA-9

07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir for 10A Node 2 install)  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
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10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 05/25/07

**Date:** Friday, May 25, 2007 2:28:46 PM

**Attachments:**

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### **ISS On-Orbit Status 05/25/07**

All ISS systems continue to function nominally, except those noted previously or below.

Working mostly in the Docking Compartment (DC1), CDR Yurchikhin and FE-1 Kotov continued preparations for the Orlan dry run on Monday (5/28) and the spacewalk ("Vykhod") on Wednesday (5/30), completing the following tasks:

- Installing Orlan ORUs (on-orbit replaceable units) such as oxygen (O<sub>2</sub>) tanks, batteries, LiOH cans, moisture collectors & feedwater filters (OTAs on the Orlans also typically include a right-hand swing arm, tool caddy, trash bags and tethers);
- Suit fit adjustment for height on both Orlan-Ms (to be repeated as necessary during the dry-run and under reduced airlock pressure);
- Leak checks & valve functionality tests on the suits, their BSS interface units and the hatch KVDs (pressure equalization valves, U.S.: PEVs) in the DC1 and SM PkhO (Service Module Transfer Compartment) from their EVA support panels (POV);
- Leak checks on the O<sub>2</sub> repressurization tanks (BK-3, primary & backup);
- Setting up the Orlan "Tranzit" communications links via the suits' BRTA radio telemetry units;
- Performing, with the ground, voice, telemetry & biomedical parameter transmission tests plus functional testing of the BETA-08 ECG (electrocardiogram) lead cable belts, to be worn under the Orlan-M suits, using the Gamma-1M medical complex from the PKO medical exam panel; and
- Unstowing & setting up medical/first aid kits for supporting the suited dry-run and the spacewalk, to be stowed again after the completion of EVA-19 in June.

The three crewmembers conducted a 1-hr review of updated procedures for operating the DC1 as an airlock for EVA, with ground specialist tagup as required. *[The review included inserting uplinked updates in two “Vykhod iz SO1” (EVA from DC1) RODF (Russian Operations Data File) books.]*

After replacing the internal Flexpack assembly of the first of two RED (Resistive Exercise Device) canisters yesterday, FE-2 today finished the R&R by installing a new spiral pulley in the first canister and replacing the second Flexpack. The canisters were then re-calibrated. *[The Flexpacks were approaching the end of their certified life of 289,000 cycles. Following the changeout, Suni was to perform the usual calibration to allow accurate execution of exercise protocol objectives. Upon receipt of the results of the calibration data, ground specialists will review the data and, assuming favorable engineering analysis, will give the crew a GO for their RED exercise session. Calibration of the load settings of the pulley cans is performed with an on-orbit calibration kit with a special calibration tool and steel handles.]*

Sunita Williams worked on the MELFI (Minus-Eighty Laboratory Freezer for ISS) rack, preparing box modules in Dewars 1 & 2 by removing Velcro straps for easier Double Coldbag packing for return on 13A.

Oleg Kotov performed the daily routine maintenance of the SOZh (ECLSS) environmental control & life support systems in the SM, including ASU toilet facilities systems/replaceables.

Working off the Russian discretionary “time permitting” task list, Fyodor Yurchikhin updated/edited the IMS (Inventory Management System) standard “delta file” for the regular weekly automated export/import to the three IMS databases on the ground (Houston, Moscow, Baikonur).

Sunita conducted the visual “T+2 Day” microbial (bacterial & fungal) analysis of the “Week 5” potable water samples, collected by her on 5/23 from the SRV-K hot tap and the EDV container of the water supply system (SVO-ZV), with the WMK (water monitoring kit) and MWAK (Microbial Water Analysis Kit). The microbiological data were then entered in the MEC (Medical Equipment Computer). *[The T+2d analysis uses incubated MCDs (Microbial Capture Devices) and CDBs (Coliform Detection Bags) from the MWAK, the later for looking for Escherichia coli bacteria.]*

Suni also did the regular bi-weekly maintenance reboot of the OCA SSC (Station Support Computer) Comm Router laptop.

Afterwards, the FE-2 performed another periodic (weekly) atmospheric status check

for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[Purpose of the 10-min. activity is to correlate the hand-held readings with MCA (Major Constituents Analyzer) readings. CSA-CP measurements were gathered with the 12A.1-delivered units #1051 (prime) & #1044 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post (prime) and in the Node (backup), with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1007 for CO<sub>2</sub> in SM (panel 449) and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1051, and returned to their regular locations.]*

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1, FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

Later today, FE-2 copies the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:15am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

The crew's usual weekly tagup with the Lead Flight Director at JSC/MCC-H is scheduled at 4:00pm, to be held via S-band/audio & Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop).

Still remaining on the Russian crew-discretionary task list are two items: (1) the need for an extensive equipment audit/inventory in the RS by Fyodor and Oleg, primarily to locate the missing NOA-2 (Nitric Oxide Analyzer) "Platon" kit, critically required for EVA-18, and (2) for Kotov to process US condensate transferred from an EDV to the SRV-K2M water processor by means of the BPK transfer pump.

*CMG-3 Testing Update:* MCC-H is currently conducting Part 2 of gimbal characterization testing on Control Moment Gyroscope 3, to determine the effects, if any, of friction on gimbal motion. *[With the rotor spin motor (and spin bearing heaters) off, each of the two gimbals (inner & outer) is being rotated through a series of pre-planned gimbal angles at very slow speed (0.001 deg/s) in both directions, with the resulting motion being observed. Part 1 of the testing was conducted recently when solar Beta angles were in the range of -40 to -20 deg; the*

*current Part 2 is at Betas of +10 to +40 deg (i.e., under different temperature extremes, first hot, then cold). The results will be used to provide baseline data, help estimate the friction in the gimbal bearing/gear train system, establish the relationship between friction and rate of gimbal motion, and evaluate any accelerometer response to the motion.]*

**Saturday Science Update:** For tomorrow's "Saturday Science" program, Suni Williams has selected another session with the EMCH (Elastic Memory Composite Hinge) experiment, consisting of three tests which will complete EMCH payload ops prior to return.

**MSS Checkout Update:** Yesterday's Flight 13A pre-launch checkout of the MSS (Mobile Service System) by ground controllers was completed with no issues. On Monday (5/28), the MT (Mobile Transporter) will be moved by ground commanding from WS4 (Worksite 4) to WS2. In Part 2 of the checkout, on Thursday (5/31), the ISS crew will maneuver the SSRMS (Space Station Remote Manipulator System) to the S3/S4 un-berth viewing position in preparation for Flight 13A.

Today's CEO (Crew Earth Observation) photo targets were **Nile River Delta** (*good pass for detailed imagery of the newly developed areas on the NE margin of the Nile delta near the Suez Canal. Requested was a mapping pass just right of track*), **Georgia Smoke Plume** (*looking backwards into the velocity vector from roughly the Georgia-Florida line, the crew should have been able to see a good example of the margin between widespread smoke and clearer air [the fire itself may have been obscured by clouds during this pass]. Oblique views of aerosols can be dramatic in low earth orbit images. The high pressure system is transporting the smoke in a great arc as far as New England and perhaps offshore of Maine*), and **Barringer Impact Crater** (*this relatively small target [1.2 km diameter] is young and therefore easy to see in the Arizona semi-desert. Aiming left of track, just beyond the visual cue of Diablo Canyon, which appears as a contorted line. Images from low earth orbit can reveal structures, especially ejecta and outer rings, which may be invisible from nearer or more distant platforms.*)

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:03am EDT [= epoch]*):

Mean altitude -- 336.2 km

Apogee height -- 341.7 km

Perigee height -- 330.7 km  
Period -- 91.26 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0008184  
Solar Beta Angle -- 28.2 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 155 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48718

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/24/07 -- EVA-18 Readiness Review (JSC)  
05/28/07 -- Orlan suited dry-run  
05/30/07 -- Russian EVA-18 (~2:20pm EDT, 6 hrs; SMDPs, ASN-M HF cable)  
06/06/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)  
06/10/07 -- (NET) STS-117/Atlantis/13A docking  
06/17/07 -- (NET) STS-117/Atlantis/13A undocking  
07/13/07 -- FGB solar array retraction  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir for 10A Node 2 install))  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/21/07 -- Progress M-60/25P undocking (SM aft port)  
08/23/07 -- (NET) STS-118/Endeavour/13A.1 landing  
09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite

12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 05/24/07

**Date:** Thursday, May 24, 2007 2:15:24 PM

**Attachments:**

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### **ISS On-Orbit Status 05/24/07**

All ISS systems continue to function nominally, except those noted previously or below.

In the Docking Compartment (DC1) "Pirs", Yurchikhin and Kotov continued preparations for the upcoming Orlan dry-run on 5/28 (Monday) and the EVA-18 spacewalk on 5/30 (Wednesday). The two cosmonauts -:

- Terminated charging of second 825M3 Orlan battery;
- Installed suit-attached hardware (OTA) on the Orlan spacesuits, followed by photo imagery of the Orlan gear and subsequent picture downlink;
- Prepared NASA auxiliary equipment for installation on the suits;
- Set up an additional portable air repress bottle (BNP) in the "Pirs" module (to support a DC1 repress in the event of a failure of the DC1/PkhO hatch's pressure equalization valve);
- Installed a second supplementary BNP portable air repress bottle in the repress line of the SM RO (Service Module Work Compartment);
- Degassed (separated liquid/gas) in cooling system of the Orlans & in BSS cooling interface unit in DC1;
- Degassed (separated liquid/gas) in BSS cooling interface unit in SM PkhO (Transfer Compartment).

After hooking up the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable at the RWS (Robotics Work Station) for video coverage, FE-2 Williams installed the OUM-PFE (Oxygen Uptake Measurement - Periodic Fitness Evaluation) equipment at the HRF-2 (Human Research Facility 2) rack. With Oleg Kotov acting as OUM-PFE operator, Sunita completed the evaluation protocol, obtaining measurements on herself on the CEVIS cycle ergometer, her fifth session. *[The operations were documented with photo and video. Later, Sunita updated the evaluation protocol, deactivated & stowed the gear, including photo/video equipment, and powered down the OUM-PFE laptop. Purpose of OUM-PFE*

*is to measure aerobic capacity during exercise. The data allows exercise physiologists & flight doctors to assess the crew's health & fitness and to provide data for modifying & updating crew-specific exercise regimes. PFE-OUM is a collaborative effort between NASA and ESA (European Space Agency).]*

Sunita supported the first part of MSS (Mobile Service System) 13A Pre-Launch Checkout by verifying proper RWS power setup. *[The individual steps for powering up the RWS, taking the MSS and SSRMS (Space Station Remote Manipulator System) to Operational mode on the primary string and also powering the MSS video components for the checkout were performed remotely by ground control. During the 13A docked phase, the SSRMS will be "handed" the S3/S4 truss by the Shuttle robot arm (SRMS) on Flight Day 3 (FD3) for installation on the S1 truss on FD4.]*

The use of DC1 as EVA airlock requires it to be isolated from the Progress M-59/24P cargo ship docked to it. To this end, Fyodor and Oleg today –

- Installed the docking mechanism (StM) in the tunnel (SU) between 24P & DC1,
- Activated the Progress and removed the air heater/fan unit & air duct from the passageway, collapsing the duct and stowing it with the heater assembly in the Russian segment,
- Removed the quick-release screw clamps which rigidized the docking joint,
- Closed the DC1-SU and SU-24P hatches (~12:10pm EDT), and
- Performed the usual one-hour leak check on both hatches.

Sunita Williams set up the SLEEP experiment for end-of-increment initializing, then swapped Actiwatch lithium batteries and stowed Clay Anderson's Actiwatch for his use upon arrival. She is wearing her own watch until her departure, after which Anderson, her replacement, will download the data. *[The NASA/JSC experiment is supported by the HRF1 laptop. To monitor the crewmembers' sleep/wake patterns and light exposure, their special Actiwatch device measure the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition.]*

The FE-1 performed the periodic collection of air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Kotov also ran the periodic test of the SM atmosphere with the CMS (Counter Measure System) Trace Contaminant Analyzer which allows real-time gas

monitoring of potential harmful contaminants (HCHO/Formaldehyde, CO/Carbon Monoxide, NH<sub>3</sub>/Ammonia, O<sub>3</sub>/Ozone, plus Benzene) in special CMS chip cassettes. *[All measured data are later to be dumped from memory device to the ground via OCA.]*

Sunita Williams had 2.5 hrs reserved for Part 1 of removing & replacing the Flexpacks in both RED (Resistive Exercise Device) canisters, along with spacers and canister cords, with on-orbit spares. In the forward canister, which exhibited “scraping”, a cord washer and washer bolt are also to be replaced. Installation is scheduled tomorrow, including calibrating both canisters. *[The Flexpacks (one each in the two RED canisters) were approaching the end of their certified life of 289,000 cycles. Following the changeout, Suni will perform the usual calibration to allow accurate execution of exercise protocol objectives. Upon receipt of the results of the calibration data, ground specialists will review the data and, assuming favorable engineering analysis, will get back to the crew quickly to give them a GO for their RED exercise session. Calibration of the load settings of the pulley cans is performed with an on-orbit calibration kit with a special calibration tool and steel handles.]*

The FE-2 conducted the weekly 10-min. CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated “cue cards” based on the crew’s water callowns are sent up every other week. The current cue card, to be updated, lists 14 water containers (~420 liters total) for the four types of water identified on board: technical water (357.3 l, for Elektron, flushing, hygiene), potable water, condensate water, waste and other.]*

Sunita also performed the daily routine maintenance of the SOZh (ECLSS) environmental control & life support systems in the SM, including ASU toilet facilities systems/replaceables.

Afterwards, Suni worked on the IMS (Inventory Management System) standard “delta file”, updating/editing it for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2/OUM-PFE), TVIS treadmill (CDR, FE-1), and VELO bike with bungee cord load trainer (CDR, FE-1).

Later tonight, FE-2 copies the crew’s exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate

Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Sunita will also terminate the 85-day maintenance charging cycle on the new 25P-delivered EMU batteries, and disconnect the UOP DCP bypass power cable at the RWS.

At ~4:25pm EDT, the crew will convene for their weekly teleconference with ISS Program Management at JSC/Houston via S-band/audio.

Still remaining on the Russian crew-discretionary task list are (1) the need for an extensive equipment audit/inventory in the RS by Fyodor and Oleg, primarily to locate the missing NOA-2 (Nitric Oxide Analyzer) "Platon" kit, critically required for EVA-18, and (2) for Kotov to process US condensate transferred from an EDV to the SRV-K2M water processor by means of the BPK transfer pump.

Yesterday (~12:25pm EDT), FE-2 Williams conducted the periodic VHF1 emergency communications check over NASA's VHF (Very High Frequency) sites at Dryden and White Sands, talking with Houston/Capcom, MSFC/PAYCOM (Payload Operation & Integration Center Communicator) and Moscow/GLAVNI (TsUP Capcom) in the normal fashion via VHF radio from a handheld microphone and any of the U.S. segment ATUs (audio terminal units). *[The test verified signal reception, link integrity, and minimum required link margin, and it confirmed S/G (space-to-ground) communications with all three control centers which provide back up communication capability with the ISS if for any reason both strings of the US S-band system become unavailable (e.g., no TDRS) or for special events such as a Soyuz relocation. (Last time done: 4/26/07.)]*

*Reboost Update:* Last night's station reboost by Progress 25P rendezvous & docking thrusters at 7:30pm was fully successful. With a burn duration of 2min 27sec, as planned, a delta-V of 0.52 m/s (target: 0.54 m/s) and a mean altitude increase of ~0.89 km (target: 0.86 km) were achieved. Purpose of the maneuver was to set up the phasing angle for STS-117/13A launch on June 8. *[Attitude control authority was handed over to Russian MCS (Motion Control System) at ~6:00pm for maneuvering to reboost attitude (& back) and returned to US CMG momentum management at ~8:20pm.]*

*EVA-18 Update:* In its EVA-18 Readiness Review this morning, the IMMT (ISS Mission Management Team) gave the Go for the Orlan spacewalk next week. Another Readiness Review will be conducted for EVA-19, planned for 6/6 (after its timeline becomes available after EVA-18).

Today's CEO (Crew Earth Observation) photo target was **Galapagos Islands**

*(Dynamic event. Looking just left of track. Sun glint should reveal the patterns of ocean currents between the islands).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 6:16am EDT [= epoch]):*

Mean altitude -- 336.3 km

Apogee height -- 341.8 km

Perigee height -- 330.8 km

Period -- 91.26 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008169

Solar Beta Angle -- 23.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude gain in last 24 hours -- 890 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48702

**Significant Events Ahead** *(all dates Eastern and subject to change):*

05/24/07 -- EVA-18 Readiness Review (JSC)

05/28/07 -- Orlan suited dry-run

05/30/07 -- Russian EVA-18 (~2:20pm EDT, 6 hrs; SMDPs, ASN-M HF cable)

06/06/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

06/10/07 -- (NET) STS-117/Atlantis/13A docking

06/17/07 -- (NET) STS-117/Atlantis/13A undocking

07/13/07 -- FGB solar array retraction

07/20/07 -- US EVA-9

07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir for 10A Node 2 install)

08/05/07 -- Progress M-59/24P undocking (DC1) & reentry

08/06/07 -- Progress M-61/26P launch

08/08/07 -- Progress M-61/26P docking (DC1)

08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking

08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking

08/21/07 -- Progress M-60/25P undocking (SM aft port)

08/23/07 -- (NET) STS-118/Endeavour/13A.1 landing

09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/23/07  
**Date:** Wednesday, May 23, 2007 2:58:15 PM  
**Attachments:**

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**ISS On-Orbit Status 05/23/07**

All ISS systems continue to function nominally, except those noted previously or below.

In the Docking Compartment (DC1), CDR Yurchikhin and FE-1 Kotov continued preparations for the upcoming Orlan dry-run on 5/28 (Monday), after configuring the DC1 comm system for their presence:

- Kotov terminated the charging on the first (of two) 825M3 Orlan battery pack and started the process on the second.
- The spacewalkers spent several hours checking out & readying the replaceable components (OTA) and auxiliary gear for their particular Orlan "skafandr" suits. *[EV1 Yurchikhin will wear Orlan #25 (red stripes) with BRTA-13 telemetry system, EV2 Kotov Orlan #26 (blue stripes) with BRTA-18. OTAs and auxiliary gear include portable primary & reserve O<sub>2</sub> tanks (BK-3) in DC1 and SM PkhO (Service Module Transfer Compartment), storage batteries (825M3), LiOH canisters (LP-9), moisture collectors, liquid cooling garments (KVO), comm headsets (ShL-10), gloves (GP-10K), thermal comfort undergarments (BK-10), socks, diapers, filters for feedwater lines (FOR), Orlan CO<sub>2</sub> measurement units (IK), degassing pump unit (BOS), etc. Fyodor also installed & checked out two new suits lights on his Orlan #26. More Orlan prep activities are scheduled tomorrow, in particular Orlan and Orlan interface unit (BSS) liquid/gas separation ("degassing") in PkhO & DC1, plus OTA installation on the Orlans. On Friday (5/25), there will be more ORU installation, gear configuring, leak checking of BSS and hoses in PkhO & DC1, plus telemetry checkouts for the spacesuits and BSS units.]*

- Later, the CDR used new medical adhesive tape delivered on Progress 25P to bind the two water tubes of his KVO liquid cooling garment together, to prevent kinking (as happened with Alex Kaleri's Orlan on EVA-9 on 2/27/04).

Time again for checking up on water quality: FE-2 Williams conducted "Week 5" sampling of potable water for chemical & microbial analysis from the SVO-ZV, SRV-K hot & SRV-K warm taps, the two latter after preliminary heating of the water (three heating cycles) and flushing. *[Sunita collected a total of five water samples from three ports for today's water collection activity: Two microbial in-flight samples for processing onboard, two chemical post-flight samples for return on 13A, all from SRV-K hot and SVO-ZV, and one sample from the SRV-K warm tap, for quicker microbial in-flight sampling using the Micro Sample In-Flight Analysis Packet. Microbial samples were collected with WMK MCDs (Water Monitoring Kit/Microbial Capture Devices). Sunita's analysis includes subsequent (within 6 hours) processing of water samples in the MWAK (microbial water analysis kit) for inflight coliform bacteria (Escherichia coli) detection. Results of the on-board processing will be available after a two-day incubation period, in case of the MWAK after 4-6 days of incubation. The sampling integrates procedures from Russian SM SOZh water collection and U.S. water sampler steps for use with potable water containers and EDV containers.]*

As part of the standard pre-EVA fitness evaluation, Yurchikhin and Kotov both undertook the Russian MO-5 MedOps protocol of cardiovascular evaluation during graded exercises on the VELO cycle ergometer, their first, each assisting the other in turn as CMO (Crew Medical Officer). *[The assessment, supported by ground specialist tagup (VHF) and telemetry monitoring, uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph cuff wired to the cycle ergometer's instrumentation panels. For the graded exercise, the subject works the pedals after a prescribed program at load settings of 125, 150, and 175 watts for three minutes each. Data output involves a kinetocardiogram, rheoplethysmogram, rheoencephalogram and a temporal pulsogram.]*

On the HRF-2 (Human Research Facility 2) rack, Sunita Williams broke out and set up most of the hardware for the OUM-PFE (Oxygen Uptake Measurement - Periodic Fitness Evaluation) assessment, scheduled for tomorrow to obtain measurements on herself (her fifth session).

For the two-day job, starting tomorrow, of replacing the Flexpack assemblies of the RED (Resistive Exercise Device), Sunita today had time set aside to inspect the work area in the Node and the accessibility and equipment to do the job. *[The Flexpacks (one each in the two RED canisters) are approaching the end of their certified life of 289,000 cycles. They will be replaced with new spares, along with*

*the canister cords. Following the changeout, Suni will perform the usual calibration to allow accurate execution of exercise protocol objectives.]*

FE-1 Kotov performed the periodic routine activation of the gas analyzer (GA) in the Soyuz TMA-10/14S spacecraft, docked at the FGB nadir port, via its InPU Integrated Control Panel.

In preparation for tonight's reboost maneuver (see below), the FE-2 shuttered the Lab science window to protect it from Progress thruster plumes.

Oleg performed the daily routine maintenance of the SOZh environmental control & life support systems in the SM, including ASU toilet facilities systems/replaceables and today also the periodic checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

Fyodor meanwhile worked on the IMS (Inventory Management System) standard "delta file", updating/editing it for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Sunita conducted the routine status checkup and filter inspection of the running CSI-4/5 (CGBA Science Insert 4/5) payload of seed germination modules and nematode worms housed in the CGBA (Commercial Generic Bioprocessing Apparatus) incubator. *[The incubator is controlled from the ground with automatic video downlinked to Earth. Students in the U.S. and Malaysia are participating in educational activities in their classrooms while monitoring the growth in orbit.]*

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (FE-2) and VELO bike with bungee cord load trainer (CDR/MO-5, FE-1/ MO-5).

Afterwards, FE-2 copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Still remaining on the Russian crew-discretionary task list are the need for an extensive equipment audit/inventory in the RS by Fyodor and Oleg, primarily to locate the missing NOA-2 (Nitric Oxide Analyzer) "Platon" kit, critically required for EVA-18, and for Kotov to process US condensate transferred from an EDV to the SRV-K2M water processor by means of the BPK transfer pump.

At ~10:35am EDT, the crew conducted two interactive TV interview exchanges

with NASA PAO clients: ABC News (Gina Sunseri), and MSNBC (Contessa Brewer) via S- & Ku-band.

At ~2:20pm, the crew held their weekly teleconference with the JSC Astronaut Office (Steven Lindsey) via S-band S/G (space-to-ground).

At ~4:50pm, Suni will have a crew-discretionary video conference via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop).

*Reboost Update:* The next station reboost by Progress 25P rendezvous & docking thrusters is scheduled for tonight at ~7:30pm EDT, with a burn duration of 2 min 27 sec, yielding a predicted delta-V of 0.5 m/s (1.64 ft/s) and a mean altitude increase of ~0.86 km (0.46 nmi.). Purpose of the maneuver is to set up the phasing angle for STS-117/13A launch on June 8. *[Attitude control authority will be handed over to Russian MCS (Motion Control System) at ~6:00pm for maneuvering to reboost attitude (& back) and returned to US CMG momentum management at ~8:20pm.]*

Today's CEO (Crew Earth Observation) photo targets were **Nile River Delta** (*crew was to shoot a nadir mapping swath to document land use changes in this intensively farmed delta*), **Cairo, Egypt** (*looking right at the apex of the Nile delta for the great urban region of Cairo which has almost doubled its footprint since handheld imaging began. Detailed images of the urban margins were requested*), and **Lake Poopó, Bolivia** (*requested were shots of the lake shoreline, under track. Water levels of this shallow lake in the high Andes desert apparently fluctuate out of phase with El Niño events (when waters offshore of Peru warm up significantly). By contrast, El Niños generate heavy rains in the coastal Atacama Desert just to the west. Lake Poopó's water levels should be at their lowest point as the recent El Niño dies out*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:50am EDT [= epoch]*):

Mean altitude -- 335.5 km

Apogee height -- 341.5 km

Perigee height -- 329.6 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008839  
Solar Beta Angle -- 18.4 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 106 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48687

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/23/07 -- Reboost by 25P (~7:30pm)  
05/24/07 -- EVA-18 Readiness Review (JSC)  
05/28/07 -- Orlan suited dry-run  
05/30/07 -- Russian EVA-18 (~2:20pm EDT, 6 hrs; SMDPs, ASN-M HF cable)  
06/06/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)  
06/10/07 -- (NET) STS-117/Atlantis/13A docking  
06/17/07 -- (NET) STS-117/Atlantis/13A undocking  
07/13/07 -- FGB solar array retraction  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir for 10A Node 2 install))  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/21/07 -- Progress M-60/25P undocking (SM aft port)  
08/23/07 -- (NET) STS-118/Endeavour/13A.1 landing  
09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch

12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/22/07  
**Date:** Tuesday, May 22, 2007 2:32:42 PM  
**Attachments:**

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**ISS On-Orbit Status 05/22/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-1 Kotov serviced the Russian BMP (Harmful Impurities Removal System), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The regen process will be terminated at ~5:25pm EDT. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

At ~3:30am, TsUP/Moscow commanded reactivation of the Elektron O<sub>2</sub> generator at 32A. CDR Yurchikhin supported the operation by monitoring the external temperature of the Elektron's secondary purification unit (BD) for the first 10 minutes of operations to ensure no overheating, a standard precaution. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Working on the BSA (Battery Storage Assembly) in the "Quest" Airlock, FE-2 Williams initiated the 85-day maintenance cycle on two new 25P-delivered EMU (Extravehicular Mobility Unit) batteries (#2039, #2040). *[The batteries will be required for the 13A spacewalks, and the periodic maintenance consists of fully discharging and then recharging the storage units to prolong their useful life. After end of the maintenance cycle, Sunita will restore the SSC laptop, which is used in DOS mode for the automated procedure, to nominal ops.]*

Sunita also supported the upcoming Orlan EVAs #18 & #19 by searching for and gathering US tools to be used in the spacewalks.

Continuing preparations for EVA-18 next week, 5/30 (Wednesday), Oleg Kotov set up the ZU-S battery charger in the "Pirs" Docking Compartment (DC1) and initiated charging on the first (of two) 825M3 battery pack (28V) for the Orlan backpack.

Fyodor Yurchikhin had three hours reserved for searching and gathering EVA tools & equipment for EVA-18. *[Going by an uplinked itemized list, the CDR collected tools for the SMDP (Service Module Debris Panel) deployment, securing aids for hardware & tools such as tethers, wire ties and bungees, and general tools like hammer, cutter, scissors, pry bar and the EVA tool "caddy" (KPU).]*

Afterwards, the two spacewalkers assembled the integrated EVA tool & equipment carryout bundle (which has to fit through the DC1 EVA hatch) for the two external tasks of (1) relocating the SMDP panels from PMA-3 to the SM, and (2) routing the ASN-M antenna HF cable from the DC1 along the SM. The activity was supported by ground specialist tagup via S-band/audio and photographed. Later, Oleg prepared the photo file for downlink via OCA for ground verification.

After FE-2 prepared the auditory test equipment, each of the three crewmembers took the periodic O-OHA (on-orbit hearing assessment) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC (Medical Equipment Computer) laptop application. It was Fyodor's & Oleg's second, Suni's sixth audiogram session. *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month. Note: There have been temporary hearing deficits documented on some U.S. and Russian crewmembers, all of which recovered to pre-mission levels.]*

The FE-1 had two hours set aside for performing the BTC-10 CARDIOCOG experiment on himself, with Fyodor taking documentary photography with the Nikon D1X. The hardware was later placed back in stowage (with IMS update). *[CARDIOCOG studies changes in the human cardiovascular system in micro-G, expressed in the peripheral arteries, and the vegetative regulation of arterial blood pressure (BP) and heart rate (HR) plus ECG (electrocardiogram). For the experiment, Oleg had to take his systolic & diastolic blood pressure measurements, heart rate data and ECG, using a finger cuff, the CARDIONAUKA-CAR kit with PTP-10 Portapress power and an electrode vest, and then stored the data on the RSE1*

*laptop for subsequent copying to a PCMCIA card and downlinking to the ground via OCA.]*

The FE-2 spent about two hours with preparing cargo items to be returned to Earth on STS-117/Atlantis (13A) next month.

Kotov took the monthly sensor readings of the Russian “Pille-MKS” radiation dosimetry experiment, with ten sensors placed at various locations in the Russian segment (port cabin window, starboard cabin window, ASU toilet facility, control panel, etc.), leaving the reader (“Pult”) powered up and calling the dosage data to TsUP/Moscow after cleanup ops.

With Huntsville’s POIC (Payload Operation & Integration Center) back “on line”, Sunita powered down and disconnected the PCS (Portable Computer System) laptop used by her for monitoring MELFI (Minus-Eighty Laboratory Freezer for ISS) status over the weekend, and returned it to stowage.

Fyodor conducted today’s routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables.

Still on the Russian crew-discretionary task list for Fyodor and Oleg remained the need for an extensive equipment audit/inventory in the RS, primarily to locate the missing NOA-2 (Nitric Oxide Analyzer) “Platon” kit which is critically required for EVA-18.

A second job on the “time permitting” task list was for Kotov to process US condensate transferred from an EDV to the SRV-K2M water processor by means of the BPK transfer pump.

Also on the voluntary task list for Fyodor was the periodic downlink of ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) AST spectrometer data from PCMCIA memory card (#925) via OCA. *[The PCMCIA was then re-inserted in the AST. The ALTCRISS spectrometer/dosimeter provides long-term records of space radiation in the SM.]*

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, FE-2 copied the crew’s exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED,

followed by their erasure on the HRM storage medium (done six times a week).

At ~10:35am, the crew conducted two interactive TV interview exchanges with PAO clients: WBZ Radio in Boston, MA (Ed Walsh), and CBS Radio Network News (Bill Harwood, Peter King).

At ~1:50pm, Sunita held an "FE-2/FE-2" teleconference via Ku- & S-band with the next ISS/Expedition 15 crewmember, Clay Anderson, who will replace her in June on 13A. *[These exchanges have the purpose to begin the handover process prior to the arrival on orbit of the next crew, through videocons and data exchanges between the current crew and the upcoming crew.]*

*BCC Checkout Update:* After yesterday's BCC (Backup Control Center) dry run in test mode between MCC-Houston and its Moscow support group (HSG), the periodic two-hour standard checkout of BCC swing and activation procedures that would be necessary in the event of a flight control transfer from Houston to the HSG (Houston Support Group) at TsUP/Moscow, is scheduled for tonight during crew sleep, with no ISS involvement. The checkout nominally concludes with HSG transferring a test PPCP (Pre-Planned Command Package) to TsUP/Moscow for subsequent real-time uplink to the station during a RGS (Russian Ground Site) comm pass. *[Purpose of this periodic exercise is to demonstrate BCC functionality under Russian assets while providing proficiency training for HSG personnel at the HSR (Houston Support Room) and TsUP-Moscow specialists. Objectives are (a) successful swing to BCC, (b) command verification (PPLP transmission, real-time command uplink, S-band time tags loaded onboard), and (c) ACT (American Contingency Telemetry) verification. The ISS EMCC (Emergency Mission Control Center), located in Russia, comprises TsUP/Moscow as the Lead Control Center, coupled with HSR at TsUP. The BCC facility provides a command & control capability from TsUP if the EMCC must be activated. This is the case in situations that render MCC-Houston unable to provide telemetry, voice, and command capability for extended periods. EMCC is also used when the threat of severe weather results in evacuation of the MCC-H building for extended periods. An actual contingency requiring BCC switchover occurred on 10/2/2002 when Hurricane Lili forced MCC-H to close down at 4:00am EDT, and also in 2005 during the Hurricane Katrina emergency.]*

*Reboost Update:* The next station reboost by Progress 25P thrusters is scheduled for tomorrow (5/23) at ~7:30pm EDT, with a burn duration of 2 min 27 sec, yielding a predicted delta-V of 0.5 m/s (1.64 ft/s) and a mean altitude increase of ~0.86 km (0.46 nmi.). Purpose of the maneuver is to set up the phasing angle for STS-117/13A launch on June 8.

*Saturday Science Update:* Sunita Williams has been given two options for the next

voluntary "Saturday Science" program on 5/26, at her choice: (a) an EMCH (Elastic Memory Composite Hinge) session with three tests, to complete the payload prior to its return, and (b) CFE-VG2 (Capillary Flow Experiment – Vane Gap 2), the fourth investigation of this experiment. The run is motivated by new science (i.e., a new meta-stable condition) discovered during the previous run, thought to be the last at that time. Suni is to downlink her acceptance and preferences by tonight.

Today's CEO (Crew Earth Observation) photo targets were **Khartoum, Sudan** (*aiming at nadir and a touch right at the confluence of the Blue and White Niles for this sprawling city. The center of Khartoum [population 3.3 million est.] lies in the narrow angle between the two Niles. But the sector on the west side of the confluence is growing fastest, mainly due to refugees from the Darfur region [SW Sudan]. Crew was to shoot the margins of the urban area*), and **Lake Chad, Chad** (*Dynamic event. Looking left of track for this major Saharan lake. Summer clouds probably obscured this long-term monitoring site. Lake Chad has remained well below its long-term level measured during the 1960s, but has shown recent signs of beginning to fill again*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:37am EDT [= epoch]*):

Mean altitude -- 335.6 km  
Apogee height -- 341.6 km  
Perigee height -- 329.6 km  
Period -- 91.25 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0008939  
Solar Beta Angle -- 13.6 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 75 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48671

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/23/07 -- Reboost by 25P (~7:30pm)  
05/24/07 -- EVA-18 Readiness Review (JSC)  
05/30/07 -- Russian EVA-18 (~2:20pm EDT)  
06/06/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

06/10/07 -- (NET) STS-117/Atlantis/13A docking  
06/17/07 -- (NET) STS-117/Atlantis/13A undocking  
07/13/07 -- FGB solar array retraction  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir for 10A Node 2 install)  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/21/07 -- Progress M-60/25P undocking (SM aft port)  
08/23/07 -- (NET) STS-118/Endeavour/13A.1 landing  
09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/21/07  
**Date:** Monday, May 21, 2007 3:14:42 PM  
**Attachments:**

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**ISS On-Orbit Status 05/21/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 163 in space for Suni Williams (launched 12/9/06 on STS-116). Underway: Week 5 of Increment 15.*

FE-1 Oleg Kotov conducted the periodic regeneration of the Harmful Impurities Removal System (BMP) in the Russian segment (RS) by starting the "bake-out" cycle to vacuum on absorbent bed #1 of the dual-channel filtration system. The regen process will be terminated at ~5:00pm EDT, before sleep time. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods. Last time done: 4/30.]*

Fyodor Yurchikhin and Oleg Kotov began preparations for their Orlan EVA (#18) next week, 5/30 (Wednesday). *[Activities today focused on an in-depth review of EVA procedures and the preliminary timeline, supported by a DVD and ground specialist tagup. The spacewalk is scheduled to begin at ~2:20pm EDT and last for ~6 hrs, concluding with DC1 hatch closure at ~8:20pm. The schedule requires a crew sleep cycle shift (wakeup on 5/30 @ 6:20am, sleep on 5/31 @ 1:00am). EVA-18 tasks include the transfer of the SMDP (Service Module Debris Panel) stowage platform from the USOS PMA-3 (Pressurized Mating Adapter 3) to the RS, partial SMDP installation (Bundle #4), and installation of an ASN-M (Satellite Navigation System) antenna cable. SMDP installation will be completed during EVA-19 on 6/6, along with installation of BIORISK-MSN payload hardware and, if time permits, routing and connecting an Ethernet cable on the FGB.]*

The two crewmembers also unstowed the afore-mentioned HF (high frequency) cable intended for external installation during the spacewalk for the ASN-M antenna feeder (for ATV arrival). *[After a careful visual inspection of the stretched-out cable, with photography, it was coiled with Velcro ("Aramid") tape and temporarily*

*stowed to await subsequent installation on the EVA-18 tool carrier. The internal portion of the cable connection was rerouted by Oleg on 5/18.]*

Williams configured the US Sony PD100 camcorder for recording video of the Orlan EVA from an RS window.

*At ~12:00pm EDT, the crew conducted a teleconference with ground specialists to discuss the downlinked imagery of their 30-min. skill training on 5/17 of the RPM (Rbar Pitch Maneuver) photo shoot. [Prior to docking, the 360-degree RPM will allow a photographic survey of the Orbiter with the ISS DCS cameras from ~600 ft distance, using 400 & 800mm focal length lenses to focus on tile acreage and door seals. Time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

*At ~1:15pm, FE-2 Williams set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 1:20pm held a ham session with students at Toyon Elementary School in San Jose, CA. [Toyon is located in the NE foothills of San Jose. The diverse student population of the school represents the many cultures and ethnicity of the district. Cultural diversity at Toyon includes African American, American Indian, Alaska Native, Asian, Filipino, Hispanic or Latino, Pacific Islander, and White. The primary languages spoken at home include Spanish, Mandarin, Cantonese, Vietnamese, Korean, Japanese, Punjabi, Hindi, Samoan and Tagalog (Philippines). Toyon is a NASA Explorer School. "When you were a small child, did you dream of being an astronaut?"; "Is it fun to work in space?"; "Have you seen anything weird in space?"; "Does it get hard for you to stay up there with the same people all the time?"]*

Fyodor and Suni undertook the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with purified water from two CWCs (Contingency Water Containers, #1068, #1035) collected by the Lab CCAA (Common Cabin Air Assembly). *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

At ~1:30pm, Sunita tagged up with ground specialists to discuss unloading and unpacking details for US cargo on Progress 25P, including IMS (Inventory Management System) specifics.

CDR Yurchikhin conducted today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables.

FE-1 Kotov worked on the IMS standard "delta file", updating/editing it for the

regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), RED resistive exercise device (CDR, FE-1, FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1).

Afterwards, the FE-2 copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~11:05am, Suni conducted a crew-discretionary downlink call via S-band/audio.

Still on the Russian crew-discretionary task list for Fyodor and Oleg was the need for an extensive equipment audit/inventory, primarily to locate the missing NOA-2 (Nitric Oxide Analyzer) "Platon" kit which is critically required for EVA-18.

A second job on the "time permitting" task list for Kotov was to process US condensate being transferred from an EDV to the SRV-K2M water processor by means of the BPK transfer pump.

New software was uploaded & tested which would enable the Russian GIVUS high-accuracy attitude sensors in the SM to support attitude control by propagating attitude rate information coming from the USOS, i.e., the four US RGAs (rate gyro assemblies). Results of the tests, which appear to have gone well, are currently being analyzed by Russian specialists.

Early this morning, starting at 1:00am EDT and running for seven hours, MCC-Houston and its Moscow support group (HSG) conducted another BCC (Backup Control Center) dry run in test mode, with no involvement of the ISS crew or vehicle. TsUP capability of commanding RS systems via US assets (S-band) remained unaffected, but MCC-H could not command via Russian assets. Actual BCC Checkout is scheduled for 5/23. *[Purpose of this periodic exercise is to demonstrate BCC functionality under Russian assets while providing proficiency training for HSG personnel at the HSR (Houston Support Room) and TsUP-Moscow specialists. The ISS EMCC (Emergency Mission Control Center), located in Russia, comprises TsUP/Moscow as the Lead Control Center, coupled with HSR at TsUP. The BCC facility provides a command and control capability from TsUP if the EMCC must be activated. This is the case in situations that render MCC-Houston unable to provide telemetry, voice, and command capability for extended periods. EMCC is also used when the threat of severe weather results in*

*evacuation of the MCC-H building for extended periods. In such an emergency, both Russian servers (CMD/command & TM/telemetry) are transitioned from MCC-H connectivity to BCC configuration, after which only the BCC can connect to the CMD and TM ports. An actual contingency requiring switchover to the BCC occurred on 10/2/2002 when Hurricane Lili forced MCC-H to shut down at 4:00am EDT, and also in 2005 during the Hurricane Katrina emergency.]*

The POIC Payload Operation & Integration Center) is back on line following last weekend's power outage. Payloads onboard were nominal all weekend (MELFI, CGBA).

A reboost of the ISS by Progress 25P thrusters is scheduled for 5/23 (Wednesday) at ~6:10pm EDT.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:14am EDT [= epoch]*):

Mean altitude -- 335.7 km

Apogee height -- 341.8 km

Perigee height -- 329.7 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0008984

Solar Beta Angle -- 8.8 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 107 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48655

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/23/07 -- Reboost by 25P (~6:10pm) **[added]**

05/24/07 -- EVA-18 Readiness Review (JSC)

05/30/07 -- Russian EVA-18 (~2:20pm EDT)

06/06/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

06/10/07 -- (NET) STS-117/Atlantis/13A docking

06/17/07 -- (NET) STS-117/Atlantis/13A undocking

07/13/07 -- FGB solar array retraction  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir for 10A Node 2 install)  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/21/07 -- Progress M-60/25P undocking (SM aft port)  
08/23/07 -- (NET) STS-118/Endeavour/13A.1 landing  
09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 05/20/07

**Date:** Sunday, May 20, 2007 1:11:10 PM

**Attachments:**

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**ISS On-Orbit Status 05/20/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Sunita Williams). Day 162 in space for Suni (launched 12/9/06 on STS-116). Ahead: Week 5 of Increment 15.*

With POIC (Payload Operation & Integration Center) in Huntsville “out of service” yesterday & today because of scheduled building power maintenance, FE-2 Williams again performed laptop-supported status checks on the two active science payloads – the MELFI (Minus-Eighty Laboratory Freezer for ISS) & CGBA-2 (Commercial Generic Bioprocessing Apparatus 2) bioprocessors/incubators.

CDR Yurchikhin conducted today’s routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Yurchikhin also gathered data on total operating time & ops durations of the Russian POTOK-150MK (150 micron) air filter unit of the SM’s SOGS air revitalization subsystem for reporting to TsUP.

The crew had their weekly PFCs (Private Family Conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC-8 laptop), Fyodor at 6:05am, Oleg at 7:35am, Suni at 9:50am & 11:25am EDT.

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (FE-2) and VELO bike with

bungee cord load trainer (CDR, FE-1).

Working off the Russian voluntary task list, Yurchikhin conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the HDV Sony HVR-Z1 camera through the DC1 EV1 window to take footage of part of Italy, with the moon in the sky, the approaching island of Sicily and then zooming in on the erupting Mt. Etna volcano.

Also off the "time permitting" task list, Kotov completed another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Sony PD-150P camcorder from SM window #7 to record fields of color in the Atlantic and Pacific ocean waters in the high production oceanic frontal zones, river runoff, and upwelling areas (rise of deep-sea highly bio-productive waters). *[Photo targets were St. Lawrence Gulf, coastal waters of NW Africa, US coastal waters near Cape Hatteras and the Amazon River runoff region in the Atlantic Ocean plus Aleutian island waters and Gulf of California in the Pacific Ocean.]*

*EVA-18 Preparations Look-ahead:* Main activities by the Russian crewmembers in the week ahead will center on preparing for Fyodor & Oleg's Orlan spacewalk on 5/30, including –

- 5/21: Review of EVA timeline, DVD animation viewing, tagup with ground specialists, photo imagery of new HF cable installation for ASN-M Satellite Navigation System (for ATV);
- 5/22: Gather EVA hardware & tools, incl. US gear, start charging first 825M3 Orlan battery;
- 5/23: MO-5 medical test, prepare Orlan ORUs, perform leak checks on Orlan cooling units for suits & BSS, install lights on Orlan #26, terminate Orlan battery 1 charging, initiate charging on second 825M3;
- 5/24: Suit & BSS cooling units degassing (DC1 & SM PkhO), install Progress 24P docking mechanism, close 24P hatches, ground conduct EVA Readiness Review;
- 5/25: Orlan ORU ops, Orlan height adjustments, suit & BSS leak checks and valve functionality tests, Orlan BETA-08 ECG belts checkout with "Gamma-1M" med complex from PKO med exam panel, Orlan & BSS BRTA radio telemetry units checkouts, in-suit "Tranzit" comm tests plus medical parameter checkout.
- 5/26-27: Rest.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are

downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

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Perigee height -- 329.8 km  
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Eccentricity -- 0.0009008  
Solar Beta Angle -- 4.2 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 158 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48639

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/24/07 -- EVA-18 Readiness Review (JSC)  
05/30/07 -- Russian EVA-18 (~2:20pm EDT)  
06/06/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)  
06/10/07 -- (NET) STS-117/Atlantis/13A docking  
06/17/07 -- (NET) STS-117/Atlantis/13A undocking  
07/13/07 -- FGB solar array retraction  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir for 10A Node 2 install)  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/21/07 -- Progress M-60/25P undocking (SM aft port)  
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10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking

11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/19/07  
**Date:** Saturday, May 19, 2007 2:45:53 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 05/19/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 15 crew CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Sunita Williams, except for regular maintenance & voluntary work. Day 160 in space for Suni (launched 12/10/06 on STS-116).*

The crew conducted the regular weekly 3-hr task of thorough station cleaning. *["Uborka", done routinely on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

With POIC (Payload Operation & Integration Center) in Huntsville "out of service" today & tomorrow because of scheduled building power maintenance, FE-2 Williams took over the job of performing laptop-supported status checks on the two active science payloads – the MELFI (Minus-Eighty Laboratory Freezer for ISS) & CGBA-2 (Commercial Generic Bioprocessing Apparatus 2) bioprocessors/incubators.

CDR Yurchikhin performed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Afterwards, Sunita worked with the ground on the extensive OpsLAN (Operations Local Area Network) software upload to SSC (Station Support Computer) laptops. *[The OpsLAN s/w loading, which installed a fresh s/w version for Increment 15 on all Client and the File Server laptops, went very well -- Flight*

*Control to Suni: "You did an awesome job on the reload! Thanks so much for your hard work on this – you made it look easy! J ".]*

At ~9:15am EDT, the crew conducted their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

After relocating the ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) spectrometer (AST) with dosimeter in the SM on 5/16, Yurchikhin checked out the PCMCIA memory card used inside the spectrometer and performed a functionality test on the instrument for subsequent long-term ALTCRISS data logging of space radiation in the Russian segment.

Working off the Russian voluntary task list, Fyodor conducted a session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature.

*[Today's Uragan photo targets were the Allaline glacier and the Alps, the west coast of Italy, Mt. Etna volcano (currently active) and the island of Sicily, and Peru with the Huascarán volcano.]*

A second discretionary task for Yurchikhin was to photograph two SKK removable cassette containers with exposed sample materials outside the ISS, SKK-9 on the SM Propulsion Compartment on handrail (h/r) 2611 (through the VL1 window of the DC1), and SKK-2 on the DC1 on h/r 3032 (through SM window #6). (Last time done 3/27/07).

Also off the task list, FE-1 Oleg Kotov used the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON) to support ecological studies. *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

The crew performed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1).

Later, Suni transferred the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

## **Weekly Science Update** (*Expedition Fifteen -- 4<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Crew performed relocation of ALTEINO device on 5/16. Photos of the new configuration were taken and will be assessed upon receipt by the science team.

*ANITA:* Planned.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2:* The “lost” power cable could not be located. New power Cable was uploaded on Progress 25P to support the second CARDIOCOG session, currently scheduled on 5/22.

*CFE (Capillary Flow Experiment):* Reserve.

*CHROMOSOME-2 (E14 SFP):* Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* The plant experiment in CGBA-4 is continuing a little longer than anticipated because this set of roots and shoots are growing at a much slower rate than seen on Side 1. “We suspect it's because we immersed the seeds at the surface of the gel this time whereas with Side 1 we placed the seeds above the gel. We continue to see live worms in CHab1 and although we don't see live worms on the back side of CHab2, we suspect we still have live worms on the front side and are happy we will have both CHabs returned on 13A.”

*CGBA-2 (Commercial Generic Bioprocessing Apparatus 2):* CGBA-2 Service Kit successfully restored CGBA-2's cooling capability. The 48-hour checkout following activation shows it holding temperature at 4C. The unit will be powered down until needed to support BCAT-3

*EarthKAM (Earth Knowledge Acquired by Middle School Students):* Complete.

*EMCH (Elastic Memory Composite Hinge):* The EMCH payload has now achieved ~80% of its mission science objectives. All operations to date have been very successful, with the hinges operating flawlessly on orbit. During the last week's operation of the experiment investigators verified that the data-taker hardware is logging the time/ temperature data successfully. The four experimental runs performed on Friday provided valuable repeatability performance data for the deployable hinges with future applications for space structures. “The EMCH team would like to thank Suni for a very productive day of EMCH operations. We look

forward to the completion of the EMCH mission with the next test session.”

*EPO (Educational Payload Operation) Kit C:* Planned.

*IMMUNO (Saliva Sampling):* Planned.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):*

“Thanks from all of us on the LOCAD team for completing the fifth and final session of phase 1 operations. You've helped us accomplish our main goals for this phase which were to demonstrate: 1) nominal function of LOCAD-PTS in a mission environment (positive control high); 2) sterility/cleanliness of supplies and procedures (negative control low); and 3) effective and consistent procedures - from swab assembly to sampling, mixing, air bubble removal, pipetting, analysis, to displayed results onboard. These accomplishments have been the first step toward a single onboard system for detection of a wide range of molecular targets.

Regarding Tuesday's session, there was indeed some large variation in 'Sample EU/ml' readings between the different swab areas. Rather than a concern, this is of interest to us (as it was for the variable readings seen for the ATU sampling site) and may reflect differences between one swab area and another in surface topography, material, texture, air flow and previous exposure to human skin. It will be interesting to match up which 'Sample EU/ml' reading corresponds to which exact swab area when we receive the photo of the air supply diffuser site. High variation between swab areas would be more of a concern when analyzing flat and uniform surface sites (such as those you tested in the Node and the sleep area), where one swab area should be very much like the other. It was reassuring to note that this variation was low at these types of site, indicating your procedures were consistent and well-performed.”

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 “Pirs”.

*MULTIGEN-1:* Planned

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* Planned.

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* NOA pouch could not be located. Under investigation by Russian team. This pouch needs to be located before the next

Russian EVA, currently planned on 5/30.

*NUTRITION*: Planned.

*SAMPLE*: Science team assessing impact of possible freezing of *SAMPLE* samples.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems)*: Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight)*: Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite)*: Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft)*: Suni was thanked for assisting the ground with the problems that were caused by the SWAB ASD during her SWAB Air sampling session on 5/13. Additionally, researchers “appreciate the extra time you took to obtain the four air samples needed for the session. The surface sampling activity went well and with it five sessions of the eight required for the experiment have been completed.”

*TRAC (Test of Reaction & Adaptation Capabilities)*: Planned.

*CEO (Crew Earth Observations)*: Through 5/12 the ground has received a total of 2,073 CEO images for review and cataloging for Increment 15. Target acquisitions identified this week are: Yellow River Delta, China; Yellowstone NP, Wyoming; Afar Rift Zone, Ethiopia; Coast Mountains, British Columbia; Shortgrass Steppe, Colorado; Fires, SE United States; and Taklamakan Desert Dust, China. The volume of photography is up with most of it being crew-selected for practice/familiarization. “This week one of your recent photos of eastern Lake Erie will be posted on NASA/GSFC’s Earth Observatory web page. Your view is compared to one taken a month earlier by Increment 14 to nicely illustrate the spring breakup of ice in Lake Erie and the Niagara River.”

Today’s CEO (Crew Earth Observation) photo targets were **Florida Coastal Everglades** (*aiming just left of track and shooting a mapping swath parallel with track to document changes in this wetland ecosystem*), **Central-Arizona Phoenix** (*shooting a mapping swath for ~30 secs just left of track, and parallel with track. Larger urban regions like Phoenix have all kinds of effects on landscapes far beyond the main built-up areas*), and **Lima, Peru** (*looking right of track near the coast for the capital city. The greater Lima urban region has a population of 9.2 million, fully one third of Peru’s population. Margins of the built-up zone are of*

*greatest interest).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:42am EDT [= epoch]*):

Mean altitude -- 336.0 km

Apogee height -- 342.1 km

Perigee height -- 329.9 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0009123

Solar Beta Angle -- -0.4 deg (magnitude bottoming out)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 40 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48623

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/24/07 -- EVA-18 Readiness Review (JSC)

05/30/07 -- Russian EVA-18 (~2:20pm EDT)

06/06/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

06/10/07 -- (NET) STS-117/Atlantis/13A docking

06/17/07 -- (NET) STS-117/Atlantis/13A undocking

07/13/07 -- FGB solar array retraction

07/20/07 -- US EVA-9

07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir for 10A Node 2 install)

08/05/07 -- Progress M-59/24P undocking (DC1) & reentry

08/06/07 -- Progress M-61/26P launch

08/08/07 -- Progress M-61/26P docking (DC1)

08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking

08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking

08/21/07 -- Progress M-60/25P undocking (SM aft port)

08/23/07 -- (NET) STS-118/Endeavour/13A.1 landing

09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15 launch

10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)

10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 05/18/07

**Date:** Friday, May 18, 2007 2:33:35 PM

**Attachments:**

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**ISS On-Orbit Status 05/18/07**

All ISS systems continue to function nominally, except those noted previously or below.

The two Russian crewmembers continued preparing for the next Orlan EVA (#18) on 5/30 by clearing out the DC-1 Docking Compartment & SM PkhO (Transfer Compartment), temporarily relocating stowage items to other areas of the SM & FGB. The transfers are supported by an uplinked detailed listing of equipment/gear & destinations, and are concurrently logged in the IMS (Inventory Management System).

FE-2 Williams had about 2 hours allocated to conduct the seventh EMCH (Elastic Memory Composite Hinge) session, first activating the experiment, then conducting operations using hinge assemblies 1, 2 and 3 under changed test parameters. The EMCH hardware was later deactivated. According to the PI (Principal Investigator), the Assembly 2 hardware is functioning properly. *[Elastic memory technology may eliminate the need for highly complex deployment mechanisms in spacecraft structures by providing a simpler, lightweight alternative. The Air Force Research Laboratory (AFRL) experiment uses six elastic memory hinges made from a unique resin and carbon fiber laminate, moving an attached mass at one end and measuring force & torque on the hinge plus the accuracy of deployment. The hinges were folded on the ground for deployment in space. A resistive heater, embedded in the EMC laminates in the hinge, provides the heat necessary for actuation, requiring 12 watts of power for 2-3 minutes. A proximity sensor attached at the end mass determines the final position upon deployment. A second motion sensor measures the deployment vs. time history. Sunita's job was to apply power to the experiment, wait for the hinges to reach the appropriate temperature and then activate each hinge individually. Video and photo documentation of deployments is required. The test articles are re-settable (with heat) to allow for multiple deployments.]*

Sunita also supported LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System) by retrieving the media slides from her last experiment session (5/15) from incubation, recording the temperature of the incubation bag and taking close-up photography of the colonies on the slides. Afterwards the media slides were discarded as wet trash.

CDR Yurchikhin conducted the periodic checkout/verification of IP-1 airflow sensors in the various Russian Segment (RS) hatch openings (8) in the SM, FGB and DC1.

With the Russian BITS2-12 onboard telemetry measurement system and VD-SU control mode deactivated (which in turn required powering down the Elektron O<sub>2</sub> generator and other RS systems), FE-1 Kotov performed maintenance on the BITS2-12 by removing & replacing a failed DKTs/TA253 Auxiliary Digital Commutator (i.e., electronic switch) of a set of four.

Afterwards, Kotov supported the ground-commanded Elektron reactivation at 32A by monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Yurchikhin performed a 2-hour repair on the AFU (Antenna Feeder Unit) of the ASN-M satellite navigation system in the Service Module (SM) by rerouting cables to recover the HF (high-frequency) loop of the ASN-M's A79 antenna. *[The HF antenna and its AFU are key parts of the PCE/Proximity Communications Equipment required for prox ops during arrival & docking of the European ATV (Automated Transfer Vehicle) "Jules Verne" later this year.]*

Sunita Williams undertook the standard monthly PEP (portable emergency provisions) safety inspection. *[The IMS-supported 30-min inspection involves verification that PFEs (portable fire extinguishers), PBAs (portable breathing apparatus), QDMAs (quick-don mask assemblies) and EHTKs (extension hose/tee kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware. In the U.S. segment (USOS), there are a total of 5 PFEs and 7 PBAs, plus 7 QDMAs and 4 EHTKs. In the Node, Suni makes sure that no more than three PBA bottles are stowed in the locker, to reduce the risk of getting too much oxygen concentration inside the stowage area in case of bottle leakage. ]*

Williams spent some time in the US Airlock/Crewlock, retrieving two EVA ratchet palm wheels from stowage bags and checking them for the condition of their

fastening screws (four each), which should be sitting flush and tight. The tools were then restowed.

In preparation for tomorrow's scheduled OpsLAN (Operations Local Area Network) software upload to SSC (Station Support Computer) laptops, the FE-2 reviewed uplinked procedures for the activity and then tagged up with OpsLAN ground specialists to discuss details of the reload. *[Tomorrow's OpsLAN s/w loading will install a fresh s/w version on all Client and the File Server laptops (from which Sunita yesterday removed personal crew files for safekeeping). More s/w reloads, for the 13A mission, will be performed later this month, requiring MDM (Multiplexer/Demultiplexer) computer transitions and/or swaps (EXT MDM; P3 MDMs).]*

Afterwards, Suni did the regular bi-weekly maintenance reboot of the OCA Comm Router 760XD laptop. *[The previous reboot, on 5/16, did not go as expected. After unsuccessful troubleshooting, the crew swapped out the OCA laptop (#6011) with a spare 760XD (#5023) which had the proper Router software load. This laptop, currently used, restored OCA functionality. The failed A31p was marked "suspect" and stowed.]*

Fyodor Yurchikhin performed another regular liquid waste transfer from two filled EDV-U urine containers to the BV2 "Rodnik" water tank of the Progress M-59/24P cargo ship, then flushed the lines with disinfectant and closed down BV2. The two EDVs will be disposed of on 24P when they are filled again, having reached the end of their service life (warranty). *[Each of the Progress' two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before receiving the liquid waste.]*

Sunita completed the periodic maintenance exchange & checkout on the two CSA-CP (Compound Specific Analyzer-Combustion Products) units, switching #1051 to prime and #1044 to backup. *[Suni changed out the prime's battery, then zero-calibrated both instruments. Following zero calibration, the new backup unit was stowed, while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

The FE-2 also performed another periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[Purpose of the 10-min. activity is to correlate the hand-held readings with MCA (Major Constituents*

*Analyzer) readings. CSA-CP measurements were gathered with the 12A.1-delivered units #1051 (prime) & #1044 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post (prime) and in the Node (backup), with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1007 for CO<sub>2</sub> in SM (panel 449) and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1051 (see above), and returned to their regular locations.]*

Kotov worked on the SM's IK0501 GA (gas analyzer) of the SOGS Pressure Control & Atmospheric Monitoring System, deactivating the unit and replacing its BF carbon dioxide (CO<sub>2</sub>) filter assembly with a new unit from FGB stowage (replaced last: 1/30/07). *[After ensuring good seals on the instrument's base and no leaks around the installed filter, Oleg reactivated the GA and stowed the spent BF for disposal. IK0501 is an automated system for measuring CO<sub>2</sub>, O<sub>2</sub>, and H<sub>2</sub>O in the air as well as the flow rate of the gas being analyzed.]*

Williams continued with the new OpsLAN outfitting for the ISL (Integrated Station LAN) begun in March, today installing Ethernet jacks in the Node by replacing a closeout panel (NOD1PD3) with a new closeout delivered on Progress 25P. *[The new panel contains 6 Ethernet ports (jacks) to provide laptop/device connectivity inside the Node (on the Port Midbay standoff) after transition of the current OpsLAN (Operations Local Area Network) over to the expanded/upgraded ISL. ISL is an upgraded on-board LAN utilizing Ethernet connectivity over an ISL Router via cable or wireless (WAP/Wireless Access Point). ISL integrates all ISS "user" devices, eventually including RS docking video distribution, payload comm & downlink (from IP modules, e.g., Columbus or JEM), crew operations, procedures viewing, email, IP phone, etc. ISL eliminates drag-through cables in hatches, will be up to ten times faster than the current OpsLAN, and has provisions for future modules. Its installation and transition were planned for Increment 15, but with the 13A slip some tasks were then moved to the preceding Increment 14.]*

For the Orlan spacewalk on 5/30 (EVA-18), Fyodor and Oleg performed the mandatory Russian pre-EVA MedOps procedure MO-6 (hand-cycle ergometry) in the SM, assisting each other in turn and supported by tagup with ground specialists who are to clear them for spacewalking. *[Because cosmonauts in early Russian programs have shown noticeable decrease in arm muscle tone, TsUP/IBMP (MCC-Moscow/Institute of Biomedical Problems) physical fitness experts have groundruled the handgrip/arm tolerance test analysis (hand ergometry) as a standard pre-Orlan EVA requirement. For MO-6, the subject dons the ECG (electrocardiogram) biomed harness, attaches three skin electrodes and plugs the harness into the PKO medical exam panel on the cycle ergometer. The other crewmember assists. The 30-min exercise itself starts after 10 seconds of*

*complete rest, by manually rotating the cycle's pedals, set at 150 W, backwards until "complete exhaustion".]*

As part of the ongoing troubleshooting of VTR-1 (Video Tape Recorder 1), which has exhibited as-yet undiagnosed performance problems, Suni today removed bypass cables from the VTR. *[This will be followed by more ground-commanded test recordings & playbacks, to permit performance comparisons with & without the cables.]*

Suni completed the regular FFQ (Food Frequency Questionnaire), her 21<sup>st</sup>, on the MEC (Medical Equipment Computer). *[By means of these FFQs, astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Oleg did today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Fyodor worked on the IMS standard "delta file", updating/editing it for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew performed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), and RED resistive exercise device (CDR, FE-1, FE-2).

Afterwards, Suni transferred the crew's CEVIS, TVIS and RED exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:00am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~5:40am, Fyodor, Oleg and Sunita linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Discussions today concerned the scientific equipment delivered aboard Soyuz 14S and its current/actual locations in the ISS, based on an uplinked list.]*

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio is scheduled at 3:30pm.

*Still on the Russian crew-discretionary task list:* (1) conducting an extensive equipment audit/inventory, primarily to locate the missing NOA-2 (Nitric Oxide Analyzer) "Platon" kit, required for EVA-18, (2) the periodic/long-term inspection of the pressure hull in the SM Working Compartment (RO), behind panels 130, 134, 135, 138, 139 and underneath the TVIS treadmill, looking for any moisture, deposits, mold, corrosion and pitting, and (3) processing US condensate being transferred from an EDV to the SRV-K2M water processor by means of the BPK transfer pump.

Today's CEO (Crew Earth Observation) photo targets were **Sudbury Impact Crater, Ontario** (*this crater is so old [1850 million years] that tectonic movements have repeatedly distorted its shape. It is also the second largest on Earth, with a long diameter of ~250 km [only an oval inner zone with a 65 km diameter is easily visible]. A mapping swath looking right of track for ~45 sec may reveal structures not yet observed. The special interest of large Earth impacts is that they create a widespread rock fractures that act as hydrothermal systems occupied by heat-loving bacteria. Versions scaled for Mars' gravity are thus an active area of research*), and **Upheaval Dome Impact Crater, Utah** (*looking off track right towards the Green River for this 10km-diameter crater*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:35am EDT [= epoch]*):

Mean altitude -- 336.0 km  
Apogee height -- 342.5 km  
Perigee height -- 329.5 km  
Period -- 91.25 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0009659  
Solar Beta Angle -- -4.8 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 71 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48608

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/24/07 -- EVA-18 Readiness Review (JSC)  
05/30/07 -- Russian EVA-18 (~2:20pm EDT)  
06/06/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)  
06/10/07 -- (NET) STS-117/Atlantis/13A docking  
06/17/07 -- (NET) STS-117/Atlantis/13A undocking  
07/13/07 -- FGB solar array retraction  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation (from Node 1 portside to nadir for 10A Node 2 install))  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*  
09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking

04/07/08 -- Progress M-63/28P undocking

04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.

04/26/08 -- (NET) STS-124/Discovery/1J docking

05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 05/17/07

**Date:** Thursday, May 17, 2007 2:38:54 PM

**Attachments:**

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### **ISS On-Orbit Status 05/17/07**

All ISS systems continue to function nominally, except those noted previously or below.

CDR Yurchikhin and FE-1 Kotov had 1.5 hours reserved for Progress 25P unloading and cargo transfers, keeping track of movements in the IMS (Inventory Management System).

Servicing the water supply system from the new Progress, FE-2 Williams replaced the EDV-ZV containers used for storing water in the Service Module (SM) with new ones, then used water from the BV1 Rodnik tank of 25P to flush and disinfect the old EDV and hoses.

The two Russian crewmembers began with preparations for the next Orlan EVA (#18) on 5/30 by relocating a host of stowage items from the DC-1 Docking Compartment and SM PkhO (Transfer Compartment) to other areas of the SM and the FGB, going by an uplinked listing of equipment/gear and destinations, while concurrently updating the IMS database. *[The EVA-18 Readiness Review will be held by the IMMT (ISS Mission Management Team) at JSC on 5/24.]*

FE-1 Kotov removed & replaced the failed BPK condensate feed pump and its control panel with a new spare. *[BPK transfers condensate to the Russian SRV-K2M water processing system.]*

With the SKV-2 air conditioner temporarily deactivated, CDR Yurchikhin later also replaced the BRPK-2 air/liquid condensate separator unit. *[Troubleshooting of the BRPK-2 on 5/3 had appeared to have cleared up the problem with the unit, but the decision was made to replace it with a spare when it later failed again.]*

FE-2 Williams had 2 hours set aside to make a special improvised "poker" tool to

assist with SA (solar array) retraction during 13A EVA, if required. *[Constructed from a sheet of Teflon (i.e., nonconductive) coldplate/wireway cover material, tie wrap and Kapton tape, the ~18 inch long hockey-stick shaped tool has the purpose of letting an EVA crewmember safely touch the FCC (Flat Conductor Cable) portion of the SA blanket in order to help its accordion-like folding during retraction, should it become necessary. All four 13A EVA crewmembers participated in the design and prototype construction of the tool. Note: the dielectric "breakdown" strength of Teflon is more than 47 times greater than the expected maximum voltage potential at the SA blanket. ]*

In support of ongoing VTR1 (Video Tape Recorder 1) troubleshooting by the ground, Williams transferred the test tape from VTR1 (port) to VTR2 (starboard) for playback, temporarily stowing the tape used last night in VTR2 to record SAW shadowing viewing. A new tape was to be inserted in VTR2 later today. *[The longeron-shadowing-on-SAW test was successful, although the charge on the 4B battery dipped below the Flight Rule limit of 65% (a lifetime-protection limit). This had been analyzed and cleared beforehand.]*

After relocating the ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) AST spectrometer with dosimeter in the SM yesterday (from panel 126 to panel 325), Yurchikhin today downlinked data stored on the AST spectrometer's PCMCIA memory card via OCA and started long-term AST data logging of space radiation in the Russian segment.

Oleg Kotov conducted the periodic collection of air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Sunita Williams started preparations for the upcoming major OpsLAN (Operations Local Area Network) software reload by first moving the crew's personal files from the FS SSC (File Server Station Support Computer) to a microdrive or to CD-R disk for protection, then printed out uplinked procedures for the extensive activity. *[The procedures will be reviewed by her and discussed during tomorrow's Reload Conference with ground specialists. The actual OpsLAN software loading, scheduled for 5/19 (Saturday), will install a fresh software version on all Client and the File Server laptops, thereby completely wiping out the hard drives. More software reloads, for the 13A mission, will be performed later this month, requiring MDM (Multiplexer/Demultiplexer) computer transitions and/or swaps (EXT MDM; P3 MDMs).]*

Yurchikhin and Kotov ran through another 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, their second, using DCS-760 digital still cameras with 400 & 800mm lenses at SM windows 6 & 8 to take imagery of documented CEO Earth targets facing the velocity vector. Afterwards, Oleg downlinked the obtained images to the ground for analysis, to be discussed at a subsequent tagup. *[The skill training prepares crewmembers for the bottomside mapping of the Orbiter at the arrival of STS-117/13A in June. During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Atlantis from SM windows 6 & 8, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

Sunita conducted the weekly 10-min. CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water callowns are sent up every other week. The current cue card, to be updated, lists 14 water containers (~440 liters total) for the four types of water identified on board: technical water (354.4 l, for Elektron, flushing, hygiene), potable water, condensate water, waste and other.]*

The FE-2 also prepared the failed TEPC (Tissue Equivalent Proportional Counter) assembly, deployed in the SM, for return on STS-117/13A. *[Due to a hardware failure of the on-orbit TEPC, replacement parts will be brought up next month on 13A. The TEPC currently on board will return in the delivery kit of the new TEPC, but not all hardware. In preparation for the 13A docked timeline, Sunita today disassembled the return hardware for a later prepack activity. The hardware that is staying on board will be repositioned for the new TEPC.]*

Sunita reactivated the autonomous ALTEA experiment, recovering the experiment's DAU (Data Acquisition Unit) with the usual ALTEA CPU (Central Processing Unit) multi-step lockup recovery procedure and readying the video equipment.

Working off the Russian "time permitting" task list, Kotov did today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Oleg also updated/edited the IMS standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle

ergometer (FE-2), TVIS treadmill (CDR), RED resistive exercise device (FE-1, FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1).

Afterwards, Suni transferred the crew's CEVIS, TVIS and RED exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~12:00pm EDT, FE-2 Williams conducted two PAO TV interview exchanges, - one with WHDH-TV (Laura Stebbins), the other with WBZ-TV (Kate Merrill), both in Boston, MA, Suni's hometown.

Later tonight, TsUP-Moscow will conduct the standard dynamic (hot firing) testing of Progress M-60 thruster systems. *[After pressurization of the Progress BG1,2 & BO1,2 resupply propellant tanks, ISS attitude control will be handed over to the Russian MCS (motion control system) at ~5:05pm EDT. There will be eight test firings of Progress DPO (approach & attitude control) thrusters, each of 10 second duration, i.e., using both Progress DPO manifolds (4 thrusters each). Control authority will then be returned to the U.S. segment (USOS) at ~7:55pm.]*

Yesterday the OCA Router SSC laptop was not rebooting as expected. After troubleshooting steps were unsuccessful, the crew swapped out the OCA laptop (#6011) with a spare 760XD (#5023) which had the proper Router software load. This laptop booted properly and restored the OCA functionality. *[The failed laptop was marked "suspect" and stowed.]*

Also yesterday, the LAB1SD5 smoke detector performed an active Built-In Test (BIT) which resulted in a caution annunciation on board. *[It is believed that the active BIT was triggered by a series of high scatter readings which initiated the fire detection algorithm, including an active BIT. The active BIT failed resulting in the caution. This has occurred three times since more restrictive scatter limits were implemented on 4/7. The scatter limits were tightened to address a low-probability failure scenario. Ground specialists are working to develop long term plans for managing the new, tighter scatter limits.]*

Today's CEO (Crew Earth Observation) photo targets were **Tenoumer Impact Crater, Mauritania** (this crater [2 km diameter] is young [only ~20,000 years old [and therefore pristine and uneroded. Lighting is good. Nadir pass), **Shortgrass Steppe, Colorado** (this LTER [Long Term Ecological Research] site lies in northern Colorado. Context views looking right of track were requested. Visual cues are the bend of the South Platte River and dry lake beds that appear white), and **Lima, Peru** (nadir pass over this capital city. The city itself lies inland on the coastal plain, with urban development extending coastward to link up with the port city of Callao.

*These peripheral expansions of the urban landscape are the specific interest of the remote sensing research community. A nadir mapping swath was requested).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:26am EDT [= epoch]*):

Mean altitude -- 336.1 km

Apogee height -- 342.7 km

Perigee height -- 329.5 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0009846

Solar Beta Angle -- -9.1 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 90 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48592

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/17/07 -- Progress 25P thruster tests

05/30/07 -- Russian EVA-18

06/06/07 -- Russian EVA-19

06/08/07 -- “Not earlier than” (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

06/10/07 -- (NET) STS-117/Atlantis/13A docking

06/17/07 -- (NET) STS-117/Atlantis/13A undocking

07/13/07 -- FGB solar array retraction

07/20/07 -- US EVA-9

07/27/07 -- PMA-3 relocation (from Node port dock to nadir for 10A Node 2 install))

08/05/07 -- Progress M-59/24P undocking (DC1) & reentry

08/06/07 -- Progress M-61/26P launch

08/08/07 -- Progress M-61/26P docking (DC1)

08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking

08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking

08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*

09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15 launch

10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)

10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/16/07  
**Date:** Wednesday, May 16, 2007 2:40:49 PM  
**Attachments:**

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### **ISS On-Orbit Status 05/16/07**

All ISS systems continue to function nominally, except those noted previously or below.

CDR Yurchikhin and FE-1 Kotov each spent about two hours with Progress 25P unloading and cargo transfers, keeping track of movements in the IMS (Inventory Management System). Sunita Williams had an additional 40 min. on her timeline for offloading US hardware from the cargo ship. *[US cargo alone comprises about 33 packages containing a wide variety of goods, from ergometer shoes, clothing items and hygiene supplies to office equipment, EMU supplies and food rations (totaling about 40 containers).]*

In preparation for the planned POIC (Payload Operations & Integration Center)/ Huntsville power outage this weekend and the upcoming 13A flight in June, FE-2 Williams readied the MELFI (Minus-Eighty Laboratory Freezer for ISS) rack by installing and setting up its PCS (Portable Computer System) laptop to conduct status checks during the outage, and configuring the Dewar 3 container with its ICEPACs to protect samples left in MELFI.

Also for the POIC outage, Sunita performed maintenance on the CGBA-2 (Commercial Generic Bioprocessing Apparatus) incubator by flushing out and replacing the fluid in the cooling loop in CGBA-2 located in the LAB1P2 rack. *[This served to bring CGBA-2 up to operating status after its failure to provide sufficient cooling during Increment 14.]*

FE-1 Kotov transferred newly arrived SPD dosimeter assemblies of the Matryoshka-R radiation monitoring payload from 25P to the ISS and installed them in the RS (Russian Segment). *[Matryoshka automatically takes radiation measurements in the SM (Service Module) and DC-1 (Docking Compartment) for studies of on-orbit radiation and long-term dose accumulation, using six SPD dosimeters deployed*

*throughout the RS as well as in a spherical body-simulating Matryoshka-R phantom.]*

The CDR relocated the ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) AST spectrometer with dosimeter (from SM panel 126 to panel 325) for subsequent operations to study space radiation in the RS.

Working in the new 25<sup>th</sup> Progress cargo ship (TKG), Oleg Kotov installed the standard US-21 matching unit, a 1-hr. task. He then completed the electronic integration of 25P into the ISS by installing the LKT local temperature sensor commutator (TA251MB) of the BITS2-12 onboard telemetry measurement system, along with its ROM unit (read-only memory, TA765B). The LKT was subsequently switched on by the ground to complete the basic configuration. *[The US-21 matching unit connects the SM with the Progress motion control and DPO thrusters systems, so that they can be commanded by the SM computer system (BVS). After bolting the box down, Oleg hooked up its the telemetry (TM) connector to the BITS2-12 onboard TM system on Go from TsUP, after Moscow had inhibited data output to the VD-SU control system mode, powered off the BITS and deactivated the Elektron and the SKV-1 air conditioner. These systems were subsequently turned back on. A dynamic thruster test of the installation is scheduled tomorrow.]*

Afterwards, Williams assisted in the reactivation of the Elektron O<sub>2</sub> generator at 32 amps by monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Continuing the extended leak checking of the spare BZh Liquid Unit (#056) for the Elektron, Yurchikhin charged the unit once again with pressurized N<sub>2</sub> from the BPA-1M Nitrogen Purge Unit (#23) to ~1.0 kg/cm<sup>2</sup>. The last test pressurization was on 4/6, the one before on 3/7. *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

The FE-1 performed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container, through a filter, with water collected in a CWC (#1035) from the Lab CCAA (Common Cabin Air Assembly) dehumidifier. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Working off the Russian “time permitting” task list, Kotov also started the regular processing (“regenerating”) of condensate water (KAV) for the Elektron oxygen generator, using the electric condensate pumping unit (BPK) of the Russian water processing system (SRV-K2M) behind SM wall panels and US Lab-collected & filtered water in CWCs (Collapsible Water Containers).

Sunita configured up the SVG (Space Video Gateway) video converter/computer for ground-conducted test operation, connecting it to a Lab PD100 camcorder and installing a mini-DV tape in the latter. Later today, the SVG will be reconfigured.

At ~9:20am EDT, after Williams had set up the video equipment, the crew conducted a live PAO/TV interview with the C-SPAN channel via S- & Ku-band.

Sunita Williams retrieved and stowed the two FMKs (Formaldehyde Monitoring Kits) deployed by her on 5/14 in the Lab (below CEVIS cycle) and SM (most forward handrail).

The CDR meanwhile printed out new ODF (Operations Data File) procedures which had arrived on Progress 25P, for insertion in the appropriate procedures/warning books. *[Existing and new procedures books in the RS currently cover SOZh, SOTR, VKS, SUI, Technology, Medical and Biological Experiments, Utilization, RS EVA-18 & EVA-19, and Progress M-60 loading/offloading.]*

Oleg did today’s routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Fyodor updated/edited the IMS standard “delta file” for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), RED resistive exercise device (CDR, FE-1, FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1).

Afterwards, Oleg copied the crew’s exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~2:42pm, Sunita Williams is to set up the SM's amateur radio equipment

(Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 2:47pm hold a ham session with students at Kenneth J. Carberry Intermediate School in Emmett, Idaho. *[A 2004 NASA Explorer School, Kenneth J. Carberry Intermediate School at Emmett has 410 students in grades 4 through 6. About 30 miles from Boise, it is situated in a "beautiful valley that is rapidly changing from a rural farming community to a commuter suburb of Boise." "If NASA can stop bone loss in astronauts in space, can they stop it on earth, too?"; "Is controlling Canadarm 2 like playing the Gamecube or is it more high tech?"; "Once in a while do you forget where you are and try to eat things the way you would on earth?"; "If I were to become an astronaut, what would I need to get to the ISS?"]*

Still on the Russian crew-discretionary task list are two previous items,- (1) conducting an extensive equipment audit/inventory, primarily to locate the missing NOA Platon kit, required for the next Russian EVA, and (2) the periodic/long-term inspection of the pressure hull in the SM Working Compartment (RO), behind panels 130, 134, 135, 138, 139 and underneath the TVIS treadmill, looking for any moisture, deposits, mold, corrosion and pitting.

Today's CEO (Crew Earth Observation) photo targets were *Arkenu 1 & 2 Impact Craters, Libya (this double impact, probably caused by a single impactor breaking up near the Earth, comprises a larger crater of 10.3 km diameter, and a smaller measuring 6.8 km in diameter. A field study in 2003 revealed rock microstructures known as shatter cones proving the impact origin of the craters), Sahara dust, tropical Atlantic Ocean (Dynamic event. A major dust outbreak from the Sahara into the tropical Atlantic is in its waning stage. Looking right far off track beyond the Cape Verde Islands for any sharp margins to the dust mass that may persist. The dust appears as a light buff-colored haze. Dust from Saharan outbreaks reaches the Americas every month of the year), and Milk River, Montana (space views of features in the Bearpaw Mts. are part of an educational project related to western exploration by Lewis and Clark and other explorers. The crew was to shoot a mapping pass under track).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** *(all dates Eastern and subject to change):*

05/17/07 -- Progress 25P thruster test

05/30/07 -- Russian EVA-18

06/06/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)  
06/10/07 -- (NET) STS-117/Atlantis/13A docking  
06/17/07 -- (NET) STS-117/Atlantis/13A undocking  
07/13/07 -- FGB solar array retraction  
07/20/07 -- US EVA-9  
07/27/07 -- PMA-3 relocation  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/15/07  
**Date:** Tuesday, May 15, 2007 2:18:12 PM  
**Attachments:**

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### **ISS On-Orbit Status 05/15/07**

All ISS systems continue to function nominally, except those noted previously or below. *A long day for the crew: 22h 50min.*

**Yest kasaniye!** Progress M-60 (25P) docked flawlessly at the Service Module (SM) aft end port at 1:10am EDT this morning, followed by docking probe retraction and hook closure (“sborka”) at 1:30am after motion damp out. All Progress systems operated nominally from Automated Rendezvous start at approximately 10:32pm, and no problems were experienced with the retraction of the Progress KURS antenna. *[Launched on 5/11 (Eastern), the 25P resupply drone delivered 5125 lbs (2325 kg) of cargo for the ISS crews, comprising 1058 lbs (480 kg) of propellant for the Russian thrusters, 926 lbs (420 kg) fresh water, 99 lbs (45 kg) of oxygen and 3042 lbs (1380 kg) of spare parts, repair gear, life support and science experiment hardware. Delivery includes 12 food containers.]*

After wake-up at a shifted 8:40pm EDT last night and breakfast, the crew began pre-docking preparations, with CDR and FE-1 readying the TORU manual backup control system on “hot standby”, and FE-2 activating the A31p laptop for the FGB single-line video feed, powering off the ALTEA (Anomalous Long Term Effects in Astronauts) payload and closing the Lab window shutters.

After the docking, Yurchikhin shut off TORU, and Kotov began reconfiguring STTS communications, while FE-2 Williams tore down the TV Ku-band connection through the US segment (USOS), including turning off the A31p laptop and disconnecting the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable at the Cupola RWS (Robotics Work Station).

At 2:30am-3:45am, the crew then conducted the standard one-hour leak checking of the PrK transfer tunnel/vestibule and fuel/oxidizer transfer line interface between Progress and SM RO (Working Compartment). During leak checking and initial

clamp installation, Russian thrusters were inhibited (as they were during docking).

After hatch opening (~4:00am), the two Russian crewmembers first installed the QD (quick disconnect) screw clamps (BZV) of the docking & internal transfer mechanism (SSVP) to rigidize the coupling.

Kotov performed the standard air sampling inside the Progress with the Russian AK-1M air sampler, then deactivated the cargo ship and installed the ventilation/heating air duct to it.

Yurchikhin turned the Node & Airlock GLA (General Luminaire Assembly) lights back on (turned off yesterday by Sunita to reduce electrical load). *[Powerdowns for the docking were required due to the feathering of the US solar arrays (to protect from thruster plumes) and the currently smaller magnitude of the solar Beta angle. Beta is the angle between the orbital plane and a line drawn from the Sun to the Earth. As Beta increases, ISS is exposed to more sunlight per orbit, eventually being in constant sunlight for some time. As Beta gets closer to 0, as now, ISS remains in the Earth's shadow (in eclipse) for extended periods of time, with less power generation.]*

After clearing the passageway to 25P by disassembling and removing the docking mechanism, Fyodor, Oleg and Sunita began Progress unloading operations while keeping track of movements in the IMS (Inventory Management System).

Kotov later used this information to update/edit the IMS standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

FE-2 Williams set up the LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System) payload equipment and at various times conducted the fifth & final sampling session of LOCAD Phase 1 ops, today swabbing samples around the air supply diffuser at the LAB1P3 rack in the Lab. The equipment was put away afterwards. *[LOCAD uses small, thumb-sized "microfluidic" cartridges that are read by the experiment reader. The cartridges contain dried extract of horseshoe crab blood cells and colorless dye. In the presence of the bacteria, the dried extract reacts strongly to turn the dye a green color. Therefore, the more green dye, the more microorganisms there are in the original sample. The handheld device tests this new analysis technology by sampling for the presence of gram negative bacteria in the sample in about 15 minutes. Lab-on-a-Chip technology has an ever-expanding range of applications in the biotech industry. Chips are available (or in development) which can also detect yeast, mold, and gram positive bacteria, identify environmental contaminants, and perform quick health diagnostics in medical clinics. The technology has been used to swab the MERs (Mars*

*Exploration Rovers) for planetary protection. With expanded testing on ISS, this compact technology has broad potential applications in space exploration--from monitoring environmental conditions to monitoring crew health.]*

Sunita also reactivated the autonomous ALTEA experiment, recovering the experiment's DAU (Data Acquisition Unit) with the usual ALTEA CPU (Central Processing Unit) multi-step lockup recovery procedure and readying the video equipment.

Suni also conducted today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The crew conducted their physical exercise program, today abbreviated to one hour each for Yurchikhin and Kotov, on the TVIS treadmill (FE-2) and RED resistive exerciser (CDR, FE-1, FE-2).

Afterwards, Suni copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink.

At ~11:15am EDT, Williams set up the SM's Kenwood amateur radio equipment (VHF transceiver with manual frequency selection, headset, and power supply) and at 11:20am held a ham session with students at Barrhaven Public School in Ottawa, Ontario/Canada. [*"Have you used the Canada arm?"; "Have there been any close calls while you were on the space station?"; "Which is more difficult,- a day at home or a day on the space station?"; "Do you wish you could bring your dogs with you in space?"*]

Crew sleeptime begins at 5:30pm EDT and extends until 2:00am, thus returning to regular hours.

*POIC Shutdown:* Over the next weekend (5/19-5/20), the Payload Operations & Integration Center (POIC) at MSFC/Huntsville will be out of service due to required building power system maintenance. Steps are now being taken to protect continuously powered science hardware on ISS, i.e., CGBA (Commercial Generic Bioprocessing Apparatus) incubator, and MELFI (Minus-Eighty Laboratory Freezer for ISS). There will also be no "Saturday Science" this time.

Today's CEO (Crew Earth Observation) photo targets were **Kabul, Afghanistan** (*aiming just left of nadir for this city of ~3 million people. Visual cues were Kabul's location in a valley and its widespread rectangular street/farm plat*), **Mt. Etna, Sicily** (*looking right at the NE corner of Sicily for likely eruptive activity*), **Charlevoix Impact Crater, Quebec** (*this ancient crater [~342 million years old] has a diameter*

of 54 km. Half the crater is under water, the other half is visible on the north side shore of the St. Lawrence River, where it lies next to a major island in the St Lawrence waterway), and **Virginia Coast Reserve, Virginia** (mapping pass looking nadir and right of track was requested: aim for coastal wetlands on the seaward side of the Delmarva Peninsula where rapid changes are occurring in this Long Term Ecological Research [LTER] site).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (all dates Eastern and subject to change):

05/17/07 -- Progress 25P thruster test

05/30/07 -- Russian EVA-18

06/06/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

06/10/07 -- (NET) STS-117/Atlantis/13A docking

06/17/07 -- (NET) STS-117/Atlantis/13A undocking

07/13/07 -- FGB solar array retraction

07/20/07 -- US EVA-9

07/27/07 -- PMA-3 relocation

08/05/07 -- Progress M-59/24P undocking (DC1) & reentry

08/06/07 -- Progress M-61/26P launch

08/08/07 -- Progress M-61/26P docking (DC1)

08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking

08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking

08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*

09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15 launch

10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)

10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing

10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks

10/22/07 -- (NET) STS-120/Discovery/10A docking

10/24/07 -- (NET) Node 2 relocation

10/31/07 -- (NET) STS-120/Discovery/10A undocking

11/06/07 -- US EVA-10

11/14/07 -- US EVA-11

11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V

11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/14/07  
**Date:** Monday, May 14, 2007 1:10:12 PM  
**Attachments:**

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### **ISS On-Orbit Status 05/14/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 4 of Increment 15.*

**Progress M-60/25P is continuing its 3-day flight to the ISS for docking tomorrow morning.** Third midcourse correction, DV3 (delta-V 1.35 m/s), was conducted nominally this morning after midnight (~00:29am EDT). All onboard tests (TV, KURS, TORU), performed during RGS (Russian ground site) passes, had no issue. *[At ~22:10pm tonight ISS attitude control authority will be handed over from US MCS (Motion Control System) to Russian thruster control, followed by Automated Rendezvous mode starting at 22:32pm, DV4 midcourse burn at ~22:55pm and ISS maneuvering to docking attitude (23:07pm). Next steps are Progress Kurs-A activation at 23:20pm, Service Module (SM) Kurs-P activation at 23:22pm, DV5 midcourse burn (23:38pm), and Kurs-A/Kurs-P short test at 15 kilometers (00:04am). Video link and 25P floodlight activation is at ~8 km distance (00:11am). After sunrise (00:28am), flyaround starts at ~00:29am (range ~400 m), stationkeeping at 00:38am (~170 m behind ISS), final approach at ~1:01am, and **docking at SM aft port at ~1:10am.** Orbital sunset occurs at ~1:24am.]*

The station crew has a short day, with a shifted sleep/work cycle to support the Progress docking: After wake-up at the regular 2:00am EDT, sleep began already at 12:10pm, to last until 8:40pm tonight. The following long workday runs until 5:30pm tomorrow evening. After that, day/night cycle returns to its regular times (2:00am – 5:30pm).

After ground-commanded deactivation of EXPRESS Rack 1 (ER1), FE-2 Williams disconnected the ITCS MTL (Internal Thermal Control. System/Moderate Temperature Loop) umbilical cooling connections of the rack.

Later, Sunita Williams unstowed the equipment for the SWAB (Surface, Water & Air

Biocharacterization) experiment and collected samples, today from several surface locations including four random samples. The samples were sealed in special SWAB tubes, labeled as to their location origins and prepared for return to Earth. *[SWAB air samples were collected yesterday.]*

CDR Yurchikhin took historical/documentary photography of Sunita's sampling activities.

FE-1 Kotov meanwhile used the Russian AK-1M adsorber to conduct the periodic sampling of cabin air for subsequent analysis on the ground, independent of SWAB. *[Kotov started out by sampling the air in the SM and FGB and to check for leaked-out Freon in the SM, then switched to the IPD-CO Draeger tubes sampler to check for CO (carbon monoxide) in the SM.]*

Sunita followed up with the GSC (Grab Sample Container), collecting air samples at the center of the Lab and SM.

In addition, Suni completed the periodic deployment of two passive FMK (formaldehyde monitoring kit) sampling assemblies in the Lab (below CEVIS) and SM (most forward handrail), to catch any atmospheric formaldehyde on a collector substrate for subsequent analysis on the ground.

Continuing the current round of the monthly preventive maintenance of RS ventilation systems, CDR Yurchikhin today took on the preventive maintenance on the ventilation system in the DC1 (Docking Compartment) by cleaning its V1, V2 and V3 filter grilles plus VD1 & VD2 air ducts.

Afterwards, Yurchikhin serviced the FGB (Funktsionalnyi-Grusovoi Blok)'s ventilation system by cleaning the detachable VT7 fan screens of the SOTR (Thermal Control System)'s gas-liquid heat exchangers (GZhT4).

The CDR also conducted today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Later, Fyodor updated/edited the IMS (Inventory Management System)'s standard "delta file" for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

In preparation for the 25P cargo ship docking, Sunita shut down the Ericsson ham radio equipment in the FGB to prevent RF (radio frequency) interference with the radio traffic between SM and Progress (KURS or TORU).

In the US segment, Suni turned off all GLA (General Luminaire Assembly) lights in the Airlock and half of the lights in the Node to reduce power consumption at the current SAW (Solar Array Wing) position for the docking.

The FE-2 also performed troubleshooting on the IWIS (Internal Wireless Instrumentation System) and successfully downloaded remaining data from RSU (Remote Sensor Unit) memory. Since ground analysis is still continuing, IWIS will not be used during the 25P docking.

A new item added to the Russian “time permitting” job list for crew discretion is an extensive audit/inventory of RS equipment located in the FGB, based on an uplinked listing of ~590 individual items, for updating the IMS and estimating the free volume still available behind the panels. *[Of central importance is the search for a “lost” pouch with the Platon Kit of the NOA-2 (Nitric Oxide Analyzer) payload last used by Thomas Reiter on 12/15/06, which must be located before the next Russian EVA, currently planned on 5/30.]*

A second new task list item for the two cosmonauts is the periodic/long-term inspection of the pressure hull in the SM Working Compartment (RO), behind panels 130, 134, 135, 138, 139 and underneath the TVIS treadmill, looking for any moisture, deposits, mold, corrosion and pitting. *[The inspection of the hull surface, which is coated with a primer and dark-green enamel, is done using cleaning napkins to wipe the area in question if required and reporting results to the ground. The hull inspection looks for changed color and cavities; if cavities are found, they are to be measured for depth after cleaning. Digital photographs of the shell before and after the removal of deposits will be made for documentation.]*

The crew had an abbreviated (1.5-hr.) physical exercise program today which they performed on the CEVIS cycle ergometer (FE-2) and TVIS treadmill (CDR, FE-1).

Afterwards, Suni copied the crew’s exercise data file to the MEC (Medical Equipment Computer) for downlink.

At ~5:25am EDT, Fyodor and Oleg conducted a one-hour tagup with ground specialists on specific aspects of the upcoming Progress docking, particularly contingencies involving the manual TORU rendezvous & docking system, which will be in “hot standby” in case of failure of the automatic KURS rendezvous.

At ~7:05am, the crew downlinked a video address to schoolchildren participating in a 12-hr school marathon concert event on June 16 by the Department of Education of West Sussex, England UK, called “Elements”. The downlink by Fyodor, Oleg and Suni involved four TV scripts (“Earth”, “Water”, “Air”, “Fire”) for taping at TsUP-Moscow. *[This was a repeat of a downlink attempted by the crew on 5/5 through*

*Russian comm assets but unfortunately resulting in insufficient quality for broadcasting to large screens during the concert. Today's repeat was conducted via US Ku-band assets.]*

*Update on SKV1:* Troubleshooting continues on the Russian SKV1 air conditioner. The shutdown after the recent test activation was caused by "undercooling", for which Russian engineers will be scheduling in inspection of the Khladon (=Freon-218) unit. SKV2 is operating nominally.

*Update on BRPK:* According to RSC-Energia, the recent problem with the BRPK Condensate Separation & Pumping Unit appears to have been a (temporarily) sticking valve and is believed to have been resolved.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
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**ISS Orbit** (*as of this morning, 6:31am EDT [= epoch]*):

Mean altitude -- 336.4 km  
Apogee height -- 343.1 km  
Perigee height -- 329.6 km  
Period -- 91.26 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0010097  
Solar Beta Angle -- -20.7 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 75 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48544

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/15/07 -- Progress M-60/25P docking (SM aft port, 1:10am)  
05/17/07 -- Progress 25P thruster test  
05/30/07 -- Russian EVA-18  
06/06/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)  
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07/20/07 -- US EVA-9  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
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08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/13/07 -- PMA-3 relocation  
08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)  
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10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10  
11/14/07 -- US EVA-11  
11/15/07 -- ATV-1 “Jules Verne” launch/Ariane V  
11/20/07 -- US EVA-12  
12/02/07 -- ATV-1 docking  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 05/13/07

**Date:** Sunday, May 13, 2007 2:40:34 PM

**Attachments:**

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**ISS On-Orbit Status 05/13/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Sunita Williams). Ahead: Week 4 of Increment 15.*

**Progress M-60/25P is continuing its rendezvous flight to the ISS.** All onboard tests (TORU, TV, etc.) have been nominal to date. 25P is currently “barbecuing” around its roll axis for thermal control. The third midcourse correction, DV3 (~3.0 m/s), is scheduled for early tomorrow morning at ~00:27am EDT, Docking is set for Tuesday morning at ~1:10am at the Service Module (SM) aft end port.

Seventh day for FE-2 Williams to perform sleep log & questionnaire entries for SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) in the experiment’s laptop application right after wakeup.

FE-1 Kotov conducted today’s routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Sunita Williams unstowed the equipment for the SWAB (Surface, Water & Air Biocharacterization) experiment and at several times during the day collected air samples. SWAB surface sampling will be conducted tomorrow and all samples prepared for return to Earth.

CDR Yurchikhin took documentary photography of the Sunita’s sampling activities.

Yurchikhin and Williams also set up and tested the television connections in the Service Module (SM) for covering the Progress docking with US assets. The necessary cable hook-up of the UOP DCP (utility outlet panel/display & control

panel) power bypass cable at the CUP RWS (Cupola Robotic Work Station) is in place. *[With the video available on an SSC (Station Support Computer) A31p laptop in the SM, the feed can be routed by single cable through the FGB and then via OpsLAN to the US segment (USOS) and downlinked from the Lab to MCC-Houston via Ku-band for subsequent transmittal to TsUP-Moscow. The TV set-up concluded with a downlink test of the configuration via Ku-band, after which the A31p was deactivated, with all cabling left intact until after the docking.]*

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (FE-2), and VELO bike with bungee cord load trainer (CDR, FE-1).

Working off his voluntary "time permitting" task list, Oleg Kotov completed another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Sony PD-150P camcorder from SM window #7 to obtain data about the position and shape of plankton field boundaries in high gradient and dynamically active areas of the Atlantic and Pacific Oceans. *[Photo targets were color bloom patterns in the ocean, swirls, water level drops, smoothing lanes in the wake of waves, and highly pronounced cloud cover anomalies in the Atlantic Ocean (Gulf of St. Lawrence, Bay of Biscayne, US coastline near Cape Hatteras, Brazilian offshore areas) and Pacific Ocean (Hokkaido Island offshore area, US offshore areas near San Francisco).]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

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Perigee height -- 329.8 km

Period -- 91.26 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0009896

Solar Beta Angle -- -24.0 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 70 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48529

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05/17/07 -- Progress 25P thruster test **[added]**  
05/30/07 -- Russian EVA-18  
06/06/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)  
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07/20/07 -- US EVA-9  
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08/08/07 -- Progress M-61/26P docking (DC1)  
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08/11/07 -- (NET) STS-118/Endeavour/13A.1 docking  
08/13/07 -- PMA-3 relocation **[new date]**  
08/21/07 -- (NET) STS-118/Endeavour/13A.1 undocking  
08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*  
09/28/07 -- Soyuz TMA-10/14S relocation (SM aft port)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
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10/04/07 -- Soyuz TMA-11/15S docking (FGB nadir port)  
10/18/07 -- Soyuz TMA-10/14S undocking (SM aft port) & landing **[new date]**  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2 "Harmony", racks  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/24/07 -- (NET) Node 2 relocation **[added]**  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
11/06/07 -- US EVA-10 **[added]**  
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11/15/07 -- ATV-1 "Jules Verne" launch/Ariane V  
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12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS

02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
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04/24/08 -- (NET) STS-124/Discovery/1J launch – JEM PM “Kibo”, racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/12/07  
**Date:** Saturday, May 12, 2007 2:40:28 PM  
**Attachments:** [image001.gif](#)

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### **ISS On-Orbit Status 05/12/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 15 crew CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Sunita Williams, except for regular maintenance & voluntary work. Day 153 in space for Suni (launched 12/10/06 on STS-116).*

Our good partners did it again: **Progress M-60 (25P) launched flawlessly** last night at on time at 11:26pm EDT (*see picture at bottom*). Separations from second and third stage were nominal. Deployment of antennas and solar panels was performed nominally. Antennas and solar arrays deployed nominally at orbit insertion (11:34pm). With that, the new cargo ship, of ~7200 kg mass including ~2400 kg of cargo, is on its way to rendezvous with ISS. 25P has a planned three-day rendezvous profile, to support docking at 1:10am EDT on Tuesday, 5/15. *[At orbit insertion, Progress unfolded two solar arrays, four Kurs antennas, one TORU/Rassvet-M antenna and one telemetry antenna. Later, the docking probe (SSH) was extended, followed by a 6-min long self-test of both subsets of the Kurs-A MCS (motion control system) including the Klest TV system. Two orbit adjustment burns of 5 min duration each were executed this morning, DV1 (~24.1 m/s) at ~3:00am & DV2 (~4.43 m/s) at ~3:38am, both with the SKD main engine. DV3 (~3.0 m/s) is scheduled for Monday morning at ~00:27am, After the three-day "chaser" flight, supported by several more midcourse burns, 25P will dock at the Service Module (SM) aft end port at ~1:10am on 5/15.]*

Sixth day for FE-2 Williams to perform sleep log & questionnaire entries for SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) in the experiment's laptop application right after wakeup.

The crew conducted the regular weekly 3-hr task of thorough station cleaning. *["Uborka", done routinely on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service*

*Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

For today's voluntary "Saturday Science" program, Sunita selected another CFE ICF2 (Capillary Flow Experiment – Interior Corner Flow 2) session, first setting up and testing the hardware, then running the operations, with a brief Ku-/S-band comm downlink at the outset, and later tearing the equipment down and putting it back in stowage with the MWA and camcorder. The experiment was recorded on Mini-DVCAM tapes. *[CFE has applications to the management of liquid fuels, cryogenics, water-based solutions and thermal fluids in spacecraft systems. ICF is one of three CFE experiments, the others being Vane Gap (VG) and Contact Line (CL). Each of the CFE experiments is represented with two unique experimental units (1 & 2), all of which use similar fluid-injection hardware, have simple and similarly sized test chambers, and rely solely on video for highly quantitative data. Silicone oil is the fluid used for all the tests, with different viscosities depending on the unit. Differences between units are primarily fluid properties, wetting conditions, and test cell cross section.]*

FE-1 Kotov performed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

FE-2 Williams conducted the microbial (bacterial & fungal) "T+5 Day" analysis of air samples collected on 5/7 with the MAS (Microbial Air Sampler) kit in Lab, Node and SM. *[The sampling analysis is performed once per month for the first three months, and once every three months thereafter. Bacterial and fungal air samples are taken at two locations in each module. The colony growth on the sampling slides is analyzed after five days of incubation in four Petri dishes. For onboard visual analysis of media slides from SSK (Surface Sampling Kit), MCDs (microbial capture devices) from WMK (Water Monitoring Kit), coliform detection bags from MWAK (Microbial Water Analysis Kit), and Petri dishes from MAS, the crew has a procedure for visual inspection of samples for bacterial and fungal colony growths after appropriate incubation periods. Petri Dishes and SSK slides were stowed for return on 13A.]*

At ~10:00am EDT, the crew conducted their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

At ~11:15am, Sunita had her weekly PFC (Private Family Conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

Working off the Russian voluntary task list, CDR Yurchikhin conducted a session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature.

*[Today's Uragan photo targets were lakes in the northern portion of the River Danube delta, a photo series of the Caucasus range, the Caspian Sea, the Alps, Allaline Glacier, the Adriatic shoreline, the Greek & Aegean Sea Islands coastline, and, through the DC1 window, the island of Sicily with Mount Etna volcano.]*

A second discretionary task list job, for Oleg Kotov, was to use the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON), today on water surfaces in the Atlantic and Pacific Oceans, Gulf of Mexico and the Gulf of California, to support ecological studies of these areas and of major cities. *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

Also from the voluntary "job jar" the FE-1 collected accumulated readings of the six Matryoshka-R Bubble Dosimeter detectors in the RS, the stowed the reader. *[The six radiation detectors now in use are positioned in the crew cabin on starboard & port, near SM window #6, plus close to the maintenance work table next to the Matryoshka's MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor panel.]*

### **Weekly Science Update (Expedition Fifteen -- 3<sup>rd</sup>)**

**ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):** On 5/9, crew performed a PCMCIA card exchange and reported on the files data sizes. ALTEINO device is functioning nominally.

**ANITA:** Planned.

**BCAT (Binary Colloidal Alloy Test):** Reserve.

**CARDIOCOG-2:** The "lost" power cable could not be located. ESA and Russian entities are sending up a new cable on Progress 25P to support the second CARDIOCOG session (NLT FD60 – approx. 6/9).

**CFE (Capillary Flow Experiment):** The third and final operation of CFE-VG2 (all

performed by Suni) was completed on 5/11. Per PI Mark Weislogel: “We got all critical angles measured to plus/minus 1 degree! Not bad. Suni is patient with the experiment, and managed to save ~20 minutes from which we got to call up a beautiful extra science run. In this extra run Suni centrifuged the liquid to the lid and rotated the dial to find the critical angle(s). But once the vane gaps were wetted, further rotation of the vane (we think) either stretched a liquid film across the vessel or the film was there from the centrifuge method. Suni anticipated our questions and provided the right pauses and descriptions over the loop. The coolest thing that happened was actually during the drain—which she has always performed perfectly. The liquid film coating the entire inner walls of the container ruptured near the liquid exit port and retracted clear across the container from the base to the lid. We would have completely misunderstood what was happening had we not have seen that. We are lucky! We opted not to put a new tape in the camcorder and record the drain which Suni requested we do. But we got the drain on the real-time downlink anyway”.

*CHROMOSOME-2 (E14 SFP)*: Completed.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus)*: Germination has occurred in all 4 chambers of GHab, Side 2. As was hoped, “the roots of at least two of the tiny plants do seem to be staying within the gel. As with Side 1, the roots of the ground plants are growing at a much faster rate than the roots of the flight plants. We will continue to observe the root and shoot growth for at least another week. Very little movement is observed in the two CHab units, but at least there is some life. The hope is to receive them back before there is none.”

*Earth Knowledge Acquired by Middle School Students (EarthKAM)*: Complete.

*EPO (Educational Payload Operation) Kit C*: Planned.

*IMMUNO (Saliva Sampling)*: Planned.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*: Reserve.

*MISSE (Materials ISS Experiment)*: Ongoing.

*MTR-2 (Russian radiation measurements)*: Passive dosimeters measurements in DC1 “Pirs”.

*MULTIGEN-1*: Planned

*MUSCLE (E14 SFP):* Completed.

*MSG-SAME (Microgravity Science Glovebox):* Planned.

*NEOCYTOLYSIS (E14 SFP):* Completed.

*NOA-2 (Nitric Oxide Analyzer):* NOA pouch could not be located. Under investigation by Russian team. This pouch needs to be located before the next Russian EVA, currently planned on 5/29.

*NUTRITION:* Planned.

*SAMPLE:* Science team assessing impact of possible freezing of SAMPLE samples.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Planned.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 5/8 the ground has received a total of 1386 CEO images for review and cataloging for Increment 15. Target acquisitions identified this week are: the Florida Coastal Everglades; the Sevilleta Wildlife Area, New Mexico; the Roundabout Fire, Southern Georgia; the Ouarkiz Impact Crater, Algeria; and Jamestown, Virginia. "In general we are pleased with the overall content, composition, and quality of your photography. When possible, please continue to practice for sharper focus with the 800mm lens setting and work for better overlap in your mapping efforts."

Today's CEO photo targets were **Taklamakan Desert Dust** (*Dynamic event. Looking left off track towards the horizon for about two minutes for views of a major dust storm that is covering the entire floor of the desert. Trying to include the surrounding mountains in any images. Dust is being transported east probably as far as Beijing*), **Fires, SE United States** (*Dynamic event. Looking right off track for the smoke pall generated by several large fires. Oblique views are effective in portraying smoke (and dust) events*), and **Sierra Madera Impact Crater** (*this crater*

*is 13 km in diameter and less than 100 million years old. It lies due south of Fort Stockton, Texas. Visual cue from orbit is a cluster of prominent center-pivot irrigation fields. The fields lie immediately up-track of the target. The crater lies under track or a touch right, on the north side of a range of hills).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:14am EDT [= epoch]*):

Mean altitude -- 336.5 km

Apogee height -- 343.4 km

Perigee height -- 329.7 km

Period -- 91.26 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0010199

Solar Beta Angle -- -27.0 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 80 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48513

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/15/07 -- Progress M-60/25P docking (SM aft port, 1:10am)

05/30/07 -- Russian EVA-18

06/06/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

06/10/07 -- (NET) STS-117/Atlantis/13A docking

06/17/07 -- (NET) STS-117/Atlantis/13A undocking

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry **[new date]**

08/06/07 -- Progress M-61/26P launch

08/08/07 -- Progress M-61/26P docking (DC1)

08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*

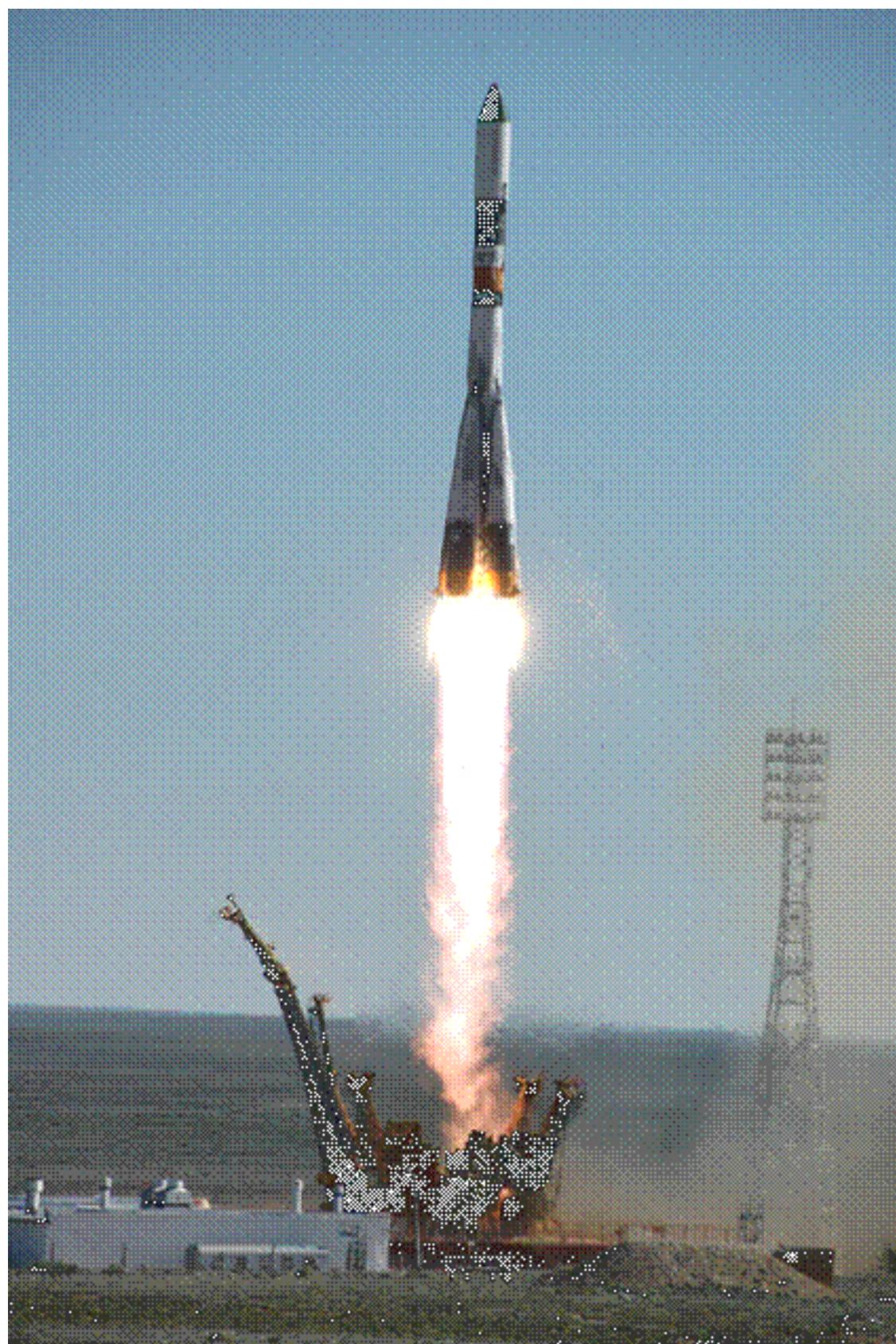
10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15 launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks **[new date]**  
10/22/07 -- (NET) STS-120/Discovery/10A docking  
10/31/07 -- (NET) STS-120/Discovery/10A undocking  
TBD -- US EVA-10,-11,-12 (Node 2, etc.)  
11/15/07 -- ATV-1 launch/Ariane V **[new date]**  
12/02/07 -- ATV-1 docking **[new date]**  
12/06/07 -- (NET) STS-122/Atlantis/1E launch -- Columbus Module, ICC-Lite  
12/08/07 -- (NET) STS-122/Atlantis/1E docking  
12/12/07 -- Progress M-62/27P launch  
12/14/07 -- Progress M-62/27P docking  
12/15/07 -- (NET) STS-122 undocking  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- Progress M-63/28P docking  
02/14/08 -- (NET) STS-123/Endeavour/1J/A launch/1J/A -- SLP-SPDM, JEM ELM-PS  
02/16/08 -- (NET) STS-123/Endeavour/1J/A docking  
02/27/08 -- (NET) STS-123/Endeavour/1J/A undocking  
04/04/08 -- ATV-1 undocking  
04/07/08 -- Progress M-63/28P undocking  
04/24/08 -- (NET) STS-124/Discovery/1J launch -- JEM PM "Kibo", racks, RMS.  
04/26/08 -- (NET) STS-124/Discovery/1J docking  
05/02/08 -- (NET) STS-124/Discovery/1J undocking

***Progress M-60/25P --- 5/11/07 Eastern***





**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/11/07  
**Date:** Friday, May 11, 2007 12:27:42 PM  
**Attachments:** [image004.gif](#)  
[image005.gif](#)  
[image006.gif](#)

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### **ISS On-Orbit Status 05/11/07**

All ISS systems continue to function nominally, except those noted previously or below. ***At Baikonur, Progress M-60/25P is all set for tonight's launch (see more below).***

Fifth day for FE-2 Williams to perform sleep log & questionnaire entries for SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) in the experiment's laptop application right after wakeup.

Before breakfast & first exercise, the three station residents completed another session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

CDR Yurchikhin (assisted by FE-1 Kotov) and Kotov (FE-2 Williams assisting), also did the second part of the PHS assessment, without blood labs. Afterwards, Williams completed data entry for both of them and stowed the PHS and MO-9 hardware. *[The U.S. PFE w/o Blood Lab is a monthly 1.5-hr. procedure which checks up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (cycle ergometer with vibration isolation) in the Lab. Readings are taken with the BP/ECG (blood pressure/electrocardiograph) and the HRM (heart rate monitor) watch with its radio transmitter. BP/ECG provides*

*automated noninvasive systolic and diastolic blood pressure measurements while also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise.]*

It was Yurchikhin's turn today with the new Russian MBI-18 DYKHANIE ("respiration", "breathing") experiment, set up yesterday by Kotov. The CDR conducted the session, supported by ground specialist tagup, and later closed down ops and stowed the equipment. *[Dykhania-1 gear uses two belts (PG-T/thoracic, PG-A/abdominal), a calibrator, resistor, mouthpiece, etc., to study fundamental physiological mechanisms of the external breathing function of crewmembers under long-duration orbital flight conditions. During the experiment, physiological measurements taken and recorded involve a pneumotachogram, thoracic pneumogram, abdominal pneumogram, and pressures in the oral cavity. All experimentally derived and salient environmental data along with personal data of the subject are recorded on PCMIA card for return to the ground at end of the Expedition. Objectives include determining the dynamics of the relationship between thoracic (pectoral) and abdominal breathing function reserves and their realization potential during spontaneous breathing, the coordinated spontaneous respiratory movements in terms of thoracic and abdominal components of volumetric, time & rate parameters of spontaneous respiratory cycle, identification of the features of humoral-reflex regulation of breathing by dynamics of ventilation sensitivity of thoracic and abdominal components to chemoreceptor stimuli, etc. Overall, the experiment is intended to provide a better understanding of the basic mechanisms of pulmonary respiration/gas exchange gravitational relations of cosmonauts.]*

FE-2 Williams performed more onboard science, today spending 3.5 hrs (including setup & teardown) with the CFE VG2 (Capillary Flow Experiment/Vane Gap 2) vessel in the Lab MWA (Maintenance Work Area). *[CFE takes advantage of the station's micro-G environment to investigate the special dynamics of capillary flow, i. e., the interaction of liquid with solid that can draw a fluid up a narrow tube and can be exploited to control fluid orientation so that fluid systems on spacecraft perform predictably. Suni performed the "Vane Gap 2" portion of the CFE suite, a study of capillary flow when there is a gap between interior corners of fluid containers, such as in the gap formed by an interior vane and tank wall of a large propellant storage tank, or the near intersection of vanes in a tank with a complex vane network. Interest is in the critical wetting angles and determination of the hysteresis to a higher accuracy than before. CFE results will have applications to management of liquid fuels, cryogenics, water-based solutions, and thermal fluids in spacecraft systems. The last CFE session was conducted by Sunita on 5/5. Today's was the 12<sup>th</sup> run aboard ISS.]*

Sunita also supported LOCAD-PTS (Lab-on-a-Chip Application Development-

Portable Test System) by retrieving the media slides from her last experiment session from incubation, recording the temperature of the incubation bag and taking close-up photography of the colonies on the slides. Afterwards the media slides were discarded as wet trash.

CDR & FE-1 set up the work area for the new Russian science payload MBI-22 BIMS and unstowed the hardware. For the subsequent experiment activity, Yurchikhin was the subject, with Kotov assisting, supported by ground specialist tagup. Today's run did not yet use the otoscope exam. *[BIMS objective is to conduct several experimental sessions in the RS (Russian segment) for filming skin portions and mucous membranes of crewmembers. It is part of a comprehensive research into using telemedical technologies for getting information from distant space crews for medical support of human space missions and information for life science flight studies. The BIMS experiment uses image capturing (video & still photo), an otoscope (or auriscope - the familiar medical device for visualizing the outer & middle ear, nose and upper throat area), the RSE-med A31p laptop and PCMCIA memory cards, to be returned to the ground to study small skin sites, conduct otorhinolaryngologic examinations (external acoustic meatus, eardrums, nasal passages), and do stomatologic (i.e., medical study of mouth and its diseases) examination of gums and teeth.]*

In preparation for the Progress docking on Tuesday (5/15, 1:10am EDT), Yurchikhin and Kotov completed the standard three-hour training course with the TORU teleoperator system, which provides a manual backup mode to the Progress' KURS automated rendezvous radar system. Afterwards, Fyodor and Oleg tagged up with TORU specialists at TsUP/Moscow via S-band audio. *[The drill, supported by an onboard simulator application, included procedure review, rendezvous, docking data and rendezvous math modeling data review, fly-around, final approach, docking and off-nominal situations (e.g., video or comm loss). The TORU teleoperator control system lets an SM-based crewmember perform the approach and docking of automated Progress vehicles in case of KURS failure. Receiving a video image of the approaching ISS, as seen from a Progress-mounted "Klest" docking television camera, on a color monitor ("Simvol-Ts", i.e. "symbol center") which also displays an overlay of rendezvous data from the onboard digital computer, the crewmember would steer the Progress to mechanical contact by means of two hand controllers, one for rotation (RUO), the other for translation (RUD), on adjustable armrests. The controller-generated commands are transmitted from the SM's TORU control panel to the Progress via VHF radio. In addition to the Simvol-Ts color monitor, range, range rate (approach velocity) and relative angular position data are displayed on the "Klest-M" video monitor (VKU) which starts picking up signals from Progress when it is still approximately 7 km away. TORU is monitored in real time from TsUP over Russian ground sites (RGS) and via Ku-band from Houston, but its control cannot be taken over from the*

ground.]

Sunita completed the regular FFQ (Food Frequency Questionnaire), her 20<sup>th</sup>, on the MEC (Medical Equipment Computer). *[By means of these FFQs, astronauts keep a personalized log of their nutritional intake over time on special MEC software. Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Oleg did the daily routine maintenance of the SOZh environmental control & life support systems in the SM, including ASU toilet facilities systems/replaceables.

FE-2 performed the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Later, Williams hooked up the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable at the RWS (Robotics Work Station) and set up camcorders for the video coverage of the Progress M-60 docking.

Sunita did the regular bi-weekly maintenance reboots of the SSC (Station Support Computer) File Server and OCA Comm Router laptops as well as the weekly reboots of the PCS (Portable Computer System) A31p laptops.

Williams also performed another periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[Purpose of the 10-min. activity is to correlate the hand-held readings with MCA (Major Constituents Analyzer) readings. CSA-CP measurements were gathered with the 12A.1-delivered units #1044 (prime) & #1051 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1007 for CO<sub>2</sub> in SM (panel 449) and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1044, and returned to their regular locations.]*

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-1, FE-2), TVIS treadmill (CDR), RED resistive exercise device (FE-1, FE-2), and VELO bike with bungee cord load trainer (CDR).

Later, Suni copied the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*Update on TVIS IFM:* Yesterday's TVIS repair (replacement of forward gyroscope wire ropes) was successfully performed by Fyodor and Sunita, but took 90 minutes longer than expected. Contributing to the stretch-out appear to have been a number of incorrect tool callouts in the uplinked procedures, which will be corrected.

*Update on Saturday Science:* For tomorrow's voluntary "Saturday Science" program, Suni has selected another CFE ICF2 (Capillary Flow Experiment – Interior Corner Flow 2) session.

*Update on Sleep Cycle Shift:* The IMMT (ISS Mission Management Team) yesterday approved the sleep cycle adjustment proposed by Moscow to support the Progress docking. With crew workday currently starting at 2:00am EDT and ending with sleep at 5:30pm, bedtime will move back 4.5 hrs to 1:00pm on Monday (5/14), followed by same-day wakeup at 8:40pm for the overnight rendezvous & docking ops. After a long day, next sleep time will be back at 5:30pm (5/15). The wake/sleep cycle will then resume at the regular hours.

*Update on Progress M-60/25P:* At Baikonur, Kazakhstan, the commission in charge yesterday gave the Go-ahead for tonight's Progress launch. The vehicle is currently undergoing final L-1 day preparations on Launch Pad 1 (**see photos below**, of yesterday). Launch is set for 11:25:36pm EDT, followed by orbital insertion at 11:34:21pm. There will be three midcourse correction burns (DV1: 5/12 - 3:00am; DV2: 5/12 - 3:38am; DV3: 5/14 - 00:27am). Six more course adjustment "tweaks" will be executed later as required. The Progress KURS-A will be activated Monday night at 11:20pm on Daily Orbit 1 (DO1), followed 2 minutes later by activation of the SM KURS-P transponders on the ISS. Video link and 25P floodlight activation is at ~8 km distance (00:11am, 5/15); flyaround in sunlight at ~400 m range starts at ~00:29am, stationkeeping at ~170 m at 00:38am, final approach at 1:01am and docking at SM aft port at ~1:10am. Orbital sunset occurs at ~1:24am.

Today's CEO (Crew Earth Observation) photo targets were **Afar Rift Zone, Ethiopia** (*this target is located at the northern end of the Great Rift Valley System of east Africa, just inland from the southern end of the Red Sea. In recent years this region has become increasingly seismically active leading geologists to believe that major visible changes, with potential sea flooding are possible in the future. This area is being monitored for landscape changes in water bodies, fault lines, and*

volcanic activity. On this pass the crew was to try for a detailed, nadir mapping strip from NW to SE), **Coast Mountains** (this target area is just beginning to come out of its heavy snow season. The crew was to use this fair-weather pass to survey the state of the snowpack and the visibility of its ice fields and glaciers to plan for more detailed views this summer), and **Shortgrass Steppe, Colorado** (this target is a Long Term Ecological Research [LTER] Site, situated primarily in northeastern Colorado and southeastern Wyoming. It is a high plateau area sloping gently eastward from the Front Range of the Rockies to the prairie lands of western Kansas and Nebraska. It is being monitored for land use changes. With this near nadir pass, the crew was to try for a detailed mapping strip from Cheyenne, Wyoming to Fort Morgan, Colorado).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

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Perigee height -- 329.6 km

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Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0010404

Solar Beta Angle -- -29.5 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 111 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48497

**Significant Events Ahead** (all dates Eastern and subject to change):

05/11/07 -- Progress M-60/25P launch (11:25:36pm)

05/15/07 -- Progress M-60/25P docking (SM aft port, 1:10am)

05/30/07 -- Russian EVA-18

06/06/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

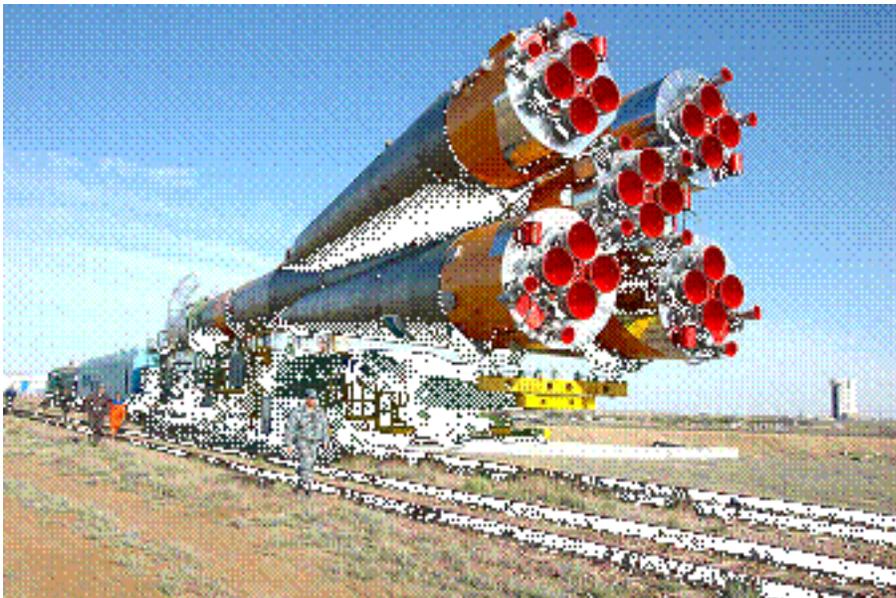
07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/05/07 -- Progress M-59/24P undocking (DC1) & reentry

08/06/07 -- Progress M-61/26P launch

08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks  
TBD -- US EVA-10,-11,-12 (Node 2, etc.)  
11/04/07 -- (NET) ATV-1 launch/Ariane V  
11/21/07 -- (NET) ATV-1 docking (opportunity)  
12/06/07 -- (NET) STS-122/Atlantis launch -- Columbus Module, ICC-Lite  
12/12/07 -- Progress M-62/27P launch  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS  
04/24/08 -- (NET) STS-124/Discovery launch – JEM PM “Kibo”, racks, RMS.





**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/10/07  
**Date:** Thursday, May 10, 2007 2:54:43 PM  
**Attachments:**

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**ISS On-Orbit Status 05/10/07**

All ISS systems continue to function nominally, except those noted previously or below.

Fourth day for FE-2 Williams to perform sleep log & questionnaire entries for SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) in the experiment's laptop application right after wakeup. *[The current seven-day sleep monitoring cycle is Sunita's third on board the ISS. The experiment is supported by the HRF1 (Human Research Facility 1) computer. To monitor her sleep/wake patterns and light exposure, the FE-2 is wearing a special Actiwatch device which measures the light levels encountered by her as well as her patterns of sleep and activity throughout the Expedition.]*

The crew conducted the regular fire drill/OBT (on-board training), a mandatory periodic one-hr exercise (including debrief conference). Primary goal of this Russian-led interactive exercise is to provide the station residents with the most realistic emergency training possible. The drill is always conducted with the support of both MCCs in close coordination. It should be performed every 2.5 months, but not later than 1 month prior to end of Increment. *[OBT objectives are to (a) practice fire response procedures (FRPs) and all incorporated actions for the case of a software-detected fire to locate, extinguish, and verify extinguishing attempts; (b) browse through RS laptop and the Signal-VM fire detection system displays as well as the automated software (algorithms) response to the fire event; (c) practice crew communication necessary to perform emergency FRPs; (d) ensure familiarization with support equipment (CSA-CP compound specific analyzer-combustion products, PBAs portable breathing assemblies, PFE/OSP-4 portable fire extinguishers, and IPK-1M gas masks to be used for fire suppression. These exercises do not actually use any fire equipment but simulate such actions to the maximum extent possible. The Emergency Procedures OBT concluded with a 15-min. debrief with Russian/U.S. ground specialists at ~10:50am EDT via S-band.]*

After Sunita's discovery of damage (fraying) on the forward gyroscope wires of the TVIS exercise treadmill during its last monthly maintenance on 5/8, CDR Yurchikhin and FE-2 Williams today worked a major 5-hr. IFM (Inflight Maintenance) on the treadmill in the Service Module (SM), performing the standard gyroscope wire rope replacement procedure. *[For the replacement, the TVIS first needed to be removed from the SM floor ("pit") and then sufficiently disassembled to allow access to the gyroscope/flywheel. Next steps were removal of the gyroscope and replacement of the wire ropes. Final steps were reassembly of the machine in reverse order and replacement of the TVIS in the pit. A total time of 5 hrs was set aside for the IFM.]*

The FE-2 inventoried the contents of a CTB (Cargo Transfer Bag) in the Node to check on quantity and serial numbers of "emerald brick" power supply/adapters for A31p laptops.

The CDR copied log files from the RS1 laptop to a CD-ROM and later downlinked them to the ground via OCA.

Yurchikhin also took the periodic (generally monthly) health test with the cardiological experiment PZEh MO-1 "Study of the Bioelectric Activity of the Heart at Rest" on the TVIS (Treadmill with Vibration Isolation System), assisted by FE-1 Kotov. *[During the 30-min. test, the crew tagged up with ground specialists on Russian ground site (RGS) passes via VHF (~4:10am EDT) and downlinked data from the Gamma-1M ECG (electrocardiograph) for about 5-6 minutes.]*

Oleg Kotov set up the equipment for the new Russian experiment DYKHANIE ("respiration", "breathing"), tagged up with ground specialists and conducted the session, later closing down and stowing the equipment. *[Dykhane-1 gear uses two belts (PG-T/thoracic, PG-A/abdominal), a calibrator, resistor, mouthpiece, etc., to study fundamental physiological mechanisms of the external breathing function of crewmembers under long-duration orbital flight conditions. During the experiment, physiological measurements are taken and recorded with a pneumotachogram, a thoracic pneumogram, an abdominal pneumogram, and pressure data in the oral cavity. All experimentally derived plus salient environmental data along with personal data of the subject are recorded on PCMIA card for return to the ground at end of the Expedition. Objectives include determining the dynamics of the relationship between thoracic (pectoral) and abdominal breathing function reserves and their realization potential during spontaneous breathing, the coordinated spontaneous respiratory movements in terms of thoracic and abdominal components of volumetric, time & rate parameters of spontaneous respiratory cycle, identification of the features of humoral-reflex regulation of breathing by dynamics of ventilation sensitivity of thoracic and abdominal components to chemoreceptor*

*stimuli, etc. Overall, the experiment is intended to provide a better understanding of the basic mechanisms of pulmonary respiration/gas exchange gravitational relations of cosmonauts.]*

The FE-1 performed an O<sub>2</sub> sensor adjustment on the Russian IK0501 gas analyzer. *[IK0501 is an automated system for measuring CO<sub>2</sub>, O<sub>2</sub>, and H<sub>2</sub>O in the air as well as the flow rate of the gas being analyzed.]*

Later, Kotov conducted the periodic collection of air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

FE-2 Williams completed the regular FDS (Fire Detection & Suppression) smoke detectors and bacteria filter inspection and cleaning in the Node.

Sunita also did the weekly 10-min. CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card lists 17 water containers (~521 liters total) for the four types of water identified on board: technical water (for Elektron, flushing, hygiene), potable water, condensate water, waste and other.]*

Afterwards, Suni offloaded the Lab CCAA (Common Cabin Air Assembly) condensate tank, filling a CWC (#1054) with the collected water slated for processing. *[Estimated offload time before termination (leaving ~5.25 kg in the tank): ~30 min.]*

Kotov ran the periodic internal pressure check on the spare BZh Liquid Unit (#056) for the Elektron-VM oxygen generator, to check for hermeticity. The unit was charged by Mikhail Tyurin on 4/6 with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#21), for the second time. *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

Oleg also did the daily routine maintenance of the SOZh environmental control & life support systems in the SM, including ASU toilet facilities systems/replaceables and today also the periodic (~monthly) checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

Fyodor Yurchikhin updated/edited the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), and RED resistive exercise device (CDR, FE-1, FE-2).

Later, FE-2 copied the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week). *[After today's IFM (see above), the TVIS was to be cleared for use, with the file of the first exercise session to be downloaded immediately for inspection by the ground specialists.]*

FE-2 Williams unstowed the AMP (Ambulatory Medical Pack) and ABPC (Automatic Blood Pressure Cuff) and set up the hardware for the general HMS PHS (Health Maintenance Systems/Periodic Fitness Evaluation) without blood lab. She also readied the equipment for the Russian "Urolux" biochemical urine testing (PZE MO-9), both to be done tomorrow near the MEC. *[MO-9 is conducted regularly every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for US crewmembers for IMG (Integrated Medical Group) PHS evaluation as part of the "PFE w/o Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. The data are then entered in the MEC's special IFEP software (In-Flight Examination Program). The U.S. PFE w/o Blood Lab is a monthly 1.5-hr. procedure which checks up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (cycle ergometer with vibration isolation) in the Lab. Readings are taken with the BP/ECG (blood pressure/electrocardiograph) and the HRM (heart rate monitor) watch with its radio transmitter. BP/ECG provides automated noninvasive systolic and diastolic blood pressure measurements while also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise.]*

The FE-2 also prepared the MELFI (Minus Eighty Degree Laboratory Freezer for the International Space Station), inserting one -21 degC ICEPAC belt and three Velcro straps in Dewar 3.

At ~3:35am EDT, Fyodor and Oleg linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Discussions today concerned general questions such as*

*the stowage location of the spare BZh Liquid Unit, type of harnesses used for exercising, available space status in DC1, etc.]*

At ~12:05pm, Sunita broke away from the TVIS repair briefly to conduct a private teleconference (Crew Discretionary Event) via S-band/audio & Ku-band/video.

Performing a “job jar” task list item yesterday, Sunita Williams swapped the IWIS RSUs (Internal Wireless Instrumentation System Remote Sensor Units) between the FGB and the Lab and then downlinked a small amount of data remaining from the recent reboost. *[The RSU that was moved from the Lab to the FGB has a slightly stronger signal than the one that was removed and it is expected this will allow all of the installed units to now connect via RF signal successfully.]*

Today's CEO (Crew Earth Observation) photo targets were **Yellow River Delta** (*researchers are monitoring the geomorphology and land use changes of this large dynamic delta system in eastern China. The crew was to use this near-nadir pass to map the coastal area either side of the delta*), **Yellowstone National Park, Wyoming** (*researchers are monitoring the seasonal variation in vegetation as well as the long-term land use changes in and around this large, famous national park area. Aiming for Yellowstone Lake just left of track and trying to map the area around it and into the rugged Absaroka Mountains to the NE*), and **West Hawk Impact Crater** (*this tiny impact, only 2.44 km in diameter, is about 351 million years old and is marked today by a small lake of the same name. It is located just north of a major highway about 100 miles east of Winnipeg, Manitoba, and about 50 miles north of the western shore of Lake of the Woods. ISS had a nadir pass. Trying for a few shots centered on the lake and then map the area around it*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:46am EDT [= epoch]*):

Mean altitude -- 336.7 km

Apogee height -- 343.7 km

Perigee height -- 329.7 km

Period -- 91.27 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0010422

Solar Beta Angle -- -31.6 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 160 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48481

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/11/07 -- Progress M-60/25P launch (11:25:36pm)  
05/15/07 -- Progress M-60/25P docking (SM aft port, 1:10am)  
05/30/07 -- Russian EVA-18  
06/06/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/06/07 -- Progress M-61/26P launch  
08/08/07 -- Progress M-61/26P docking (DC1)  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks  
TBD -- US EVA-10,-11,-12 (Node 2, etc.)  
11/04/07 -- (NET) ATV-1 launch/Ariane V  
11/21/07 -- (NET) ATV-1 docking (opportunity)  
12/06/07 -- (NET) STS-122/Atlantis launch -- Columbus Module, ICC-Lite  
12/12/07 -- Progress M-62/27P launch  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS  
04/24/08 -- (NET) STS-124/Discovery launch -- JEM PM "Kibo", racks, RMS.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 05/09/07  
**Date:** Wednesday, May 09, 2007 12:08:14 PM  
**Attachments:**

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### **ISS On-Orbit Status 05/09/07**

All ISS systems continue to function nominally, except those noted previously or below. *Russian National Holiday: Victory Day, celebrating the end of the Great Patriotic War (World War II) with Nazi Germany, and a crew off-duty day.*

Third day for FE-2 Williams to perform sleep log & questionnaire entries for SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) in the experiment's laptop application right after wakeup. *[The current seven-day sleep monitoring cycle is Sunita's third on board the ISS. The experiment is supported by the HRF1 (Human Research Facility 1) computer. To monitor her sleep/wake patterns and light exposure, the FE-2 is wearing a special Actiwatch device which measures the light levels encountered by her as well as her patterns of sleep and activity throughout the Expedition.]*

Williams also conducted the routine status checkup and filter inspection of the running CSI-4/5 (CGBA Science Insert 4/5) payload of seed germination modules and nematode worms housed in the CGBA (Commercial Generic Bioprocessing Apparatus) incubator. *[The incubator is controlled from the ground with automatic video downlinked to Earth. Students in the U.S. and Malaysia are participating in educational activities in their classrooms while monitoring the growth in orbit.]*

CDR Yurchikhin performed his second routine servicing of the ESA/Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), first testing the AST-SM1 spectrometer's PCMCIA memory card (#924) in laptop RSK1 and ascertaining its file sizes, then checking the spectrometer's six LEDs (light emitting diodes) as health check, before replacing memory card #924. Previously accumulated data were downlinked from PCMCIA card #925 and the card returned to its stowage pouch. *[ALTCRISS uses the AST spectrometer employed by VC8 guest cosmonaut Roberto Vittori in 2005 in the DC1 for the Italian LAZIO (Low Altitude Zone/Ionization Observatory) experiment.]*

FE-1 Kotov performed today's routine maintenance of the SOZh system (ECLSS/ Environment Control & Life Support System) in the SM, including ASU toilet facilities systems/replaceables.

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the TVIS (CDR, FE-1, FE-2), RED resistive exercise device (FE-2). and VELO bike with bungee cord load trainer (CDR, FE-1).

Later today, FE-2 will copy the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:40am EDT, Yurchikhin and Kotov downlinked a TV message of greetings to be played at the gala meeting of the talent competition "Space through the Eyes of Youth", to be held on 5/25 at the city of Voronezh by the Cosmonautics Federation of Russia and the N.N. Burdenko State Medical Academy of Voronezh under the Federal Agency for Health Care and Social Development. [*...Dear Children, if you are still dreaming, if you are still thinking of Space, if you still remember heroic deeds of cosmonauts who lead us to far-away galaxies, then you are on the right track. You will succeed, and the Universe will open its many mysteries....*]

At ~10:40am, Sunita Williams powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 10:45am conducted a ham session with students at Sunset Mesa Schools in Albuquerque, New Mexico. [*Sunset Mesa Schools is an independent, non-sectarian school in Albuquerque's Northeast Heights. "How does the transition from liftoff to weightlessness feel?"; "Is there anything in space that holds promise for curing diseases that we don't have cures for on Earth?"; "Do humans age slower in space than on Earth?"; "How do you get oxygen when you are inside the Space Station?"*]

At 11:05am, Suni held a second ham session, with students at Escola Secundaria de Estarreja in Estarreja, Portugal. [*The Estarreja Secondary School is one of the largest in Central Portugal, with 1200 students and 57 classes, ranging from the scientific areas of IT, Mechanics, Electronics and Robotics Engineering to Chemistry and Biology. The school also has a tradition in the teaching of foreign languages with departments of English, German, French and Spanish. "What limitations do you have while you are in space?"; "How is it like to have visitors on-board with you and how do they react to life on-board the ISS?"; "What would you say to a little kid who wants to become an astronaut?"; "In your opinion, where do humans and the life on Earth come from? Do you believe in life somewhere in the*

*infinity of the Universe?"]*

The two Russian crewmembers had PFCs (Private Family Conferences) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop),- Fyodor at 7:00am, Oleg at 8:30am.

Today's CEO (Crew Earth Observation) photo targets were **Mt. Etna volcano, Sicily** (*Etna, on the east coast of Sicily, continues to erupt. ISS had a nadir pass with only scattered clouds likely. Authorities are preparing engineering work to divert the flow of lava streams away from roads, houses and fields. Center point 37.3N 15.3E*), **Toshka Lakes, Egypt** (*Spring-season images of the string of new lakes in SW Egypt were requested. Shooting right and nadir for the lakes. Lake levels have started to drop in what is feared to be a long term trend that could endanger the plan to move millions of Egyptians to agricultural developments around these lakes. Center point 22.9N 31.1E*), and **Jamestown, Virginia** (*near-nadir pass: aiming a touch left of track for Jamestown Island, at a major bend in the James River. Center point 37.3N 15.3E.*)

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Revolutions since FGB/Zarya launch (Nov. 98) -- 48466

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05/15/07 -- Progress M-60/25P docking (SM aft port, 1:10am) **[new time]**

05/30/07 -- Russian EVA-18

06/06/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/05/07 -- Progress M-59/24P undocking (DC1) & reentry  
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08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
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10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks  
TBD -- US EVA-10,-11,-12 (Node 2, etc.)  
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11/21/07 -- (NET) ATV-1 docking (opportunity)  
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12/12/07 -- Progress M-62/27P launch  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS  
04/24/08 -- (NET) STS-124/Discovery launch – JEM PM “Kibo”, racks, RMS.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/08/07  
**Date:** Tuesday, May 08, 2007 1:41:20 PM  
**Attachments:**

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**ISS On-Orbit Status 05/08/07**

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For FE-2 Williams it was the second day of her third seven-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) monitoring, in which she performs sleep log & questionnaire entries in the experiment's laptop application right after wakeup. *[The experiment is supported by the HRF1 (Human Research Facility 1) computer. To monitor her sleep/wake patterns and light exposure, the FE-2 is wearing a special Actiwatch device which measures the light levels encountered by her as well as her patterns of sleep and activity throughout the Expedition.]*

In preparation for Progress M-60/25P docking next Tuesday (5/15), CDR Yurchikhin and FE-1 Kotov conducted the standard 40-min. vehicle-to-vehicle TORU test between the SM and the docked Progress-59/24P, closely monitored by ground personnel on DO3 (Daily Orbit 3). Progress thrusters (DPO) were inhibited and not involved. *[TORU lets a Service Module (SM)-based crewmember perform the approach & docking of automated Progress vehicles manually in case of KURS failure.]*

The two Russian crewmembers each completed the 2.5-hr Part 2 of their first onboard "Profilaktika" (MBI-8, "Countermeasures") preventive health maintenance fitness test series, including ECG (Electrocardiogram), blood tests and subjective rating. *[Today's fitness test was performed on the TVIS treadmill in unmotorized (idle) mode, with free choice of speeds within the range permitted. The test differs from the normal TVIS session by the use of the TEEM-100 gas analyzer (via a mask equipped with a pneumotachometer sensor), measurement of blood lactate level and subjective evaluation of physical exertion levels during the test. The lactate blood samples were taken twice at the end of the session, using the*

*ACCUSPORT analyzer and REFLOTRON-4 accessories. Results were entered on a log sheet. TEEM and ECG (electrocardiograph) data were transferred to the RSE-Med laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]*

FE-2 Williams conducted onboard science with another session of the experiment LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System). After setting up the payload equipment, the FE-2 performed her fourth run of LOCAD swabbing operations, adding a repeat of “negative control” swabs to the standard four swab tests, today at the Lab’s aft ATU (Audio Terminal Unit). The activities were videotaped and the equipment stowed afterwards. *[LOCAD uses small, thumb-sized “microfluidic” cartridges that are read by the experiment reader. The cartridges contain dried extract of horseshoe crab blood cells and colorless dye. In the presence of the bacteria, the dried extract reacts strongly to turn the dye a green color. Therefore, the more green dye, the more microorganisms there are in the original sample. The handheld device tests this new analysis technology by sampling for the presence of gram negative bacteria in the sample in about 15 minutes. Lab-on-a-Chip technology has an ever-expanding range of applications in the biotech industry. Chips are available (or in development) which can also detect yeast, mold, and gram positive bacteria, identify environmental contaminants, and perform quick health diagnostics in medical clinics. The technology has been used to swab the MERs (Mars Exploration Rovers) for planetary protection. With expanded testing on ISS, this compact technology has broad potential applications in space exploration--from monitoring environmental conditions to monitoring crew health.]*

The CDR continued the audit of SVO Water Supply System equipment begun on 4/2 by the E14 crew and on 4/19 by Fyodor and Oleg, based on an uplinked IMS (Inventory Management System) listing. *[The listing includes such items as hoses, EDV container, mating and pressurization adapters, and a pumping unit.]*

Oleg Kotov started the regular processing (“regenerating”) of condensate water (KAV) for the Elektron oxygen generator, using the electric condensate pumping unit (BPK) of the Russian water processing system (SRV-K2M) behind SM wall panels and US Lab-collected & filtered water in CWCs (Collapsible Water Containers). *[A disinfectant solution was used for cleaning the empty EDV receptacle.]*

Afterwards, the FE-1 performed the periodic (about twice a month) replenishing of the Elektron’s water supply for electrolysis, filling the KOV thermal loops’ EDV container with water collected in CWCs from the Lab CCAA (Common Cabin Air Assembly) dehumidifier. *[The 40-minute procedure is specially designed to*

*prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

As part of the continuing efforts to reduce onboard noise, Oleg used the Russian sound level meter (SLM) to take acoustic readings in the SM from several locations before the planned installation of noise suppressors for two fans (VGZhT1 & VGZhT4). A second acoustic measurement session is scheduled after the installation of the muffler equipment. The SLM data were subsequently transferred to the US MEC (Medical Equipment Computer) by FE-2 for downlinking via OCA. The activity was supported by specialist tagup. *[The measurements were taken with only continuously operating onboard systems running in the background, including Vozdukh at 100% air flow, in two stages: with all fans running, and with several key fans shut down.]*

With the BITS2-12 onboard telemetry measurement system and VD-SU control mode deactivated (~8:10am - 8:40am EDT), which in turn required powering down Elektron and other RS systems, Yurchikhin removed a temperature sensor (TM168-04) inside the soft air duct between the FGB & SM and replaced it with a spare, using the soldering iron for disconnecting & connecting its three sensor wires.

Afterwards, the CDR supported the reactivation of the Elektron O<sub>2</sub> generator at 32A by monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Sunita Williams had an hour on her timeline for cleaning the CCDs (Charge-Coupled Devices) of several DCS760 digital cameras (#1012, #1039, #1015, #1013), in the order of from "dirtiest" to "cleanest". *[The CCD cleaning should reduce "spotting" on digital imagery.]*

Photography was also on FE-1 Kotov's activity schedule: using the Nikon D1X camera with flash to take pictures of the Soyuz TMA-10 interior for subsequent downlink via OCA. *[Main subjects of interest were IMV (Intermodular Ventilation) equipment in 14S, such as air duct routing & attachments, BVN heater fan, the BIP power units' DTG temperature sensor, etc.]*

Continuing the current round of the monthly preventive maintenance of RS ventilation systems, Kotov today cleaned interior closeout panel vent screens (panels 201, 301, 401) in the FGB (*Funktsionalnyi-Grusovoi Blok*). Afterwards, he also cleaned the Group A fan grilles in the SM, including the VPrK and VPkHO

ventilator screens in the aft end. *[Quite frequently lost items can be found by checking out these ventilation screens.]*

Oleg performed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Sunita updated/edited the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Suni performed the regular monthly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), inspecting the condition of harnesses, belt slats, corner bracket ropes, IRBAs (Isolation Restorative Bungee Assemblies) and gyroscope wire ropes for any damage or defects, lubricating as required plus recording time & date values.

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene), on the CEVIS cycle ergometer (FE-2), TVIS (CDR/MBI-8, FE-1/MBI-8) and RED resistive exercise device (FE-2).

Later today, FE-2 will copy the crew's exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Suni took her Sony PD100 camcorder for another video "tour" of the ISS compartments for subsequent downlink to MCC-Houston. (Last time done by L-A on 10/20/06). *[The footage provides valuable situational insight in the current configuration of the station interior for the FCT (Flight Control Team) and will also be used for upcoming Expedition and Shuttle crews for pre-flight "handover" training.]*

At ~10:15am EDT, the crew participated via PAO TV in the VIP event of Queen Elizabeth II visiting the NASA Goddard Space Flight Center (GSFC) at Greenbelt, MD, accompanied by the NASA Administrator and British-born Astronaut Mike Foale, serving as ground contact for the crew. The event was live on NASA TV. *[Her Majesty's husband, Prince Philip, Duke of Edinburgh, meanwhile visited GSFC testing facilities for a demonstration of EVA work to be performed on the Hubble Telescope.]*

*Update on Russian BRPK:* The Condensate Separation & Pumping Unit replaced

yesterday by Oleg was BRPK2 (not BRPK1), using the unit modified by Fyodor on 5/3 (by replacing its pipeline with a new line without filter or safety valve that have caused fluid backflow via a bypass line during condensate evacuation). Kotov then activated lane 2 but when a "Separator Full" message appeared, he turned lane 2 off for 30 seconds and then back on. String 2 then ran successfully for a brief period of time before ground specialists directed the crew turn it off and to re-activate lane 1. BRPK1 has received a new BTA heat exchanger on 5/4. Ground specialists believe the BRPK2 R&R was successful; however, they are still planning to have the crew flush out the air/liquid separator in the near future.

*Update on EMCH:* Sunita received thanks for yesterday's successful Air Force Research Laboratory EMCH (Elastic Memory Composite Hinge) activities. "We have now achieved 50% of our mission goals and applaud your enthusiasm and efficiency!"

Today's CEO (Crew Earth Observation) photo targets were **Urumqi, China** (*China's oil town in its far west is one of the fastest growing cities in Asia. Shooting left towards a major gap in the Tien Shan mountain chain. Center point 43.3N 87.3E*), **Dunde Ice Cap, China** (*looking left near track for this remote site in central Asia. The Dunde Ice Cap is one of the first lower-latitude ice caps to be drilled in Asia. Cores from subtropical ice caps are revealing climate histories over the last few thousand years, providing critical data for global climate models. Analysis of three cores from Dunde show that the last 50 years on the Tibetan Plateau seem to have been the warmest since the end of the last ice age 10,000 years ago. Center point 38.15N 96.05E*), and **Chongqing, China** (*aiming left for this major city, population 4.1 million [2005]. Chongqing (Chunking) is located on the winding Yangtze River, probably the best visual cue from orbit. Context images are requested. Looking just left of track. Center point 29.6N 106.4E.*)

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
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Perigee height -- 330.0 km

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Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0010518

Solar Beta Angle -- -34.3 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 90 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48450

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05/11/07 -- Progress M-60/25P launch (11:25pm)  
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06/06/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)  
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08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/07/07  
**Date:** Monday, May 07, 2007 2:05:12 PM  
**Attachments:**

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**ISS On-Orbit Status 05/07/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 3 of Increment 15.*

Before breakfast, CDR Yurchikhin, FE-1 Kotov & FE-2 Williams performed the Russian biomedical routine assessments of PZeh-MO-7/Calf Volume Measurement and PZeh-MO-8/Body Mass Measurement (2<sup>nd</sup> time for Fyodor and Oleg, 9<sup>th</sup> time for Suni), using the IM mass measurement device which Kotov afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference pints, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

The two Russian crewmembers worked in the Progress M-59/24P vehicle, dismantling the Kurs-A rendezvous & approach radar system of its motion control & navigation system (SUDN) and removing it from the logistics drone, a 3-hr. job. These valuable components, stowed in the FGB, will be returned to Earth on the Shuttle for reuse. *[KURS-A is the active half of the Russian space program's proven S-band radar system for automated flight, which measures relative motion parameters between Progress (or Soyuz) and the ISS during rendezvous operations, to enable the autopilot's calculation of corrective impulses. The system's passive transponder counterpart (KURS-P) is on the Service Module (SM), with one antenna each at the tip of the two solar array wings.]*

FE-2 Williams conducted the sixth EMCH (Elastic Memory Composite Hinge) session. Activities consisted of activating the experiment and conducting operations using hinge assemblies 1, 2 and 3 under changed test parameters. The EMCH hardware was later deactivated and returned to stowage. (PI to Sunita: "The memory hinge deployments are proving the science!"). *[Elastic memory technology may eliminate the need for highly complex deployment mechanisms in spacecraft structures by providing a simpler, lightweight alternative. The Air Force Research Laboratory (AFRL) experiment uses six elastic memory hinges made from a unique resin and carbon fiber laminate, moving an attached mass at one end and measuring force & torque on the hinge plus the accuracy of deployment. The hinges were folded on the ground for deployment in space. A resistive heater, embedded in the EMC laminates in the hinge, provides the heat necessary for actuation, requiring 12 watts of power for 2-3 minutes. A proximity sensor attached at the end mass determines the final position upon deployment. A second motion sensor measures the deployment vs. time history. Sunita's job was to apply power to the experiment, wait for the hinges to reach the appropriate temperature and then activate each hinge individually. Video and photo documentation of deployments is required. The test articles are re-settable (with heat) to allow for multiple deployments.]*

CDR Yurchikhin and FE-1 Kotov each completed a 2h 30m session of Part 1 of their first onboard "Profilaktika" (MBI-8, "Countermeasures") preventive health maintenance fitness test series, starting with the VELO stationary cycle ergometer. *[Fyodor and Oleg will do an additional part of the test tomorrow (5/8) on the TVIS treadmill. Test procedure for MBI-8 is identical to the Russian MO-5 assessment, but in addition to the nominal procedure it uses the TEEM-100M gas analyzer with breathing mask, a blood lactate test with the ACCUSPORT analyzer and REFLOTRON-4 accessories, and a subjective evaluation of physical exertion levels during the test (using the Borg Perceived Exertion Scale, viz., 10 steps from very light over hard and very hard to maximum). Results are entered on a log sheet. TEEM and ECG (electrocardiograph) data are transferred to the RSE-Med Laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]*

Oleg Kotov continued the troubleshooting/maintenance of the Russian SKV1 air conditioner, today replacing its BRPK air/liquid condensate separator & pumping unit with a spare unit, stowing the failed BRPK. SKV1 was briefly activated for testing but turned off on indication of pending overheating. *[Earlier (5/3), the crew had attempted to remove air from line 3 of the BRPK's membrane tank, without success. Based on analysis of a unit returned from the ISS, ground specialists believe the on-board unit has some liquid inside which has solidified over time preventing the condensate from being pushed through the system. It is expected*

*that a procedure will be developed for the crew to clean out the plumbing in the system at a later date. The BRPK replacement has erroneously been reported earlier, at 4/25.]*

Kotov also set up the batteries of the A31p laptops RS2 & RS3 for charging, monitored the process and terminated it some two hours later. The laptops were then turned on to check their charge.

Continuing the current round of the monthly preventive maintenance of RS (Russian Segment) ventilation systems, the CDR today serviced the four PF1-4 dust filters in the SM by changing out their cartridges. He then moved over to the FGB to clean the ventilation screens on its interior wall panels.

FE-1 had earlier worked in the Soyuz 14S Orbital Module to clean the spacecraft's BVN fan & air heater assembly.

Using the MAS (Microbial Air Sampler) kit, Sunita Williams gathered air samples in Lab, Node & SM for bacterial and fungal analysis. Later, she also collected collect surface sample swabs in Lab & Node for cultivation/incubation with the EHS (Environmental Health Systems) SSK. *[The MAS sampling analysis is performed once per month for the first three months, and once every three months thereafter. Bacterial and fungal air samples are taken at two locations in each module. The colony growth on the sampling slides will be analyzed after five days of incubation in 4 Petri dishes. As done for MAS, SSK sampling is performed once per month for the first three months that a module is on orbit and once every three months thereafter. Bacterial and fungal samples are taken at two locations in each module, with the prime site in the Lab being the air supply diffuser at the LAB1P5 rack. The colony growth on the 10 sampling slides will be analyzed after five days of incubation. For onboard visual analysis of media slides from SSK (Surface Sample Kit), MCDs (Microbial Capture Devices) from WMK (Water Monitoring Kit), coliform detection bags from MWAK (Microbial Water Analysis Kit), and Petri dishes from MAS, the crew has a procedure for visual inspection of samples for bacterial and fungal colony growths after appropriate incubation periods.]*

Suni worked on the RED (Resistive Exercise Device), replacing canister pulley cables (done after every 53,515 cycles, based on life cycle testing results & safety controls), afterwards concluding with the standard Flexpac canister load calibration as required after cable replacements. (Last time done: 3/5). *[The replacement was overdue since the canister pulley cables exceeded their certified life of 53,515 cycles last week. Since then, the crew inspected the cords for damage prior to each exercise session (as usually done in the monthly inspections). Suni's on-orbit calibration of the Schwinn RED cans re-established the relationship of specific load settings with a specific number of pulls per setting, followed by recording of the load*

*values measured with a calibration tool and steel handles from the on-orbit calibration kit.]*

Yurchikhin completed the periodic switch of the Russian telephone/telegraph subsystem (STTS) between strings, today from its backup string to nominal mode on the primary string. *[The "Voskhod-M" STTS enables telephone communications between the SM, FGB, DC1 Docking Compartment and U.S. segment (USOS), and also with users on the ground over VHF channels selected by an operator at an SM comm panel, via STTS antennas on the SM's outside. There are six comm panels in the SM with pushbuttons for accessing any of three audio channels, plus an intercom channel. Other modes of the STTS include telegraphy (teletype), EVA voice, emergency alarms, Packet/Email, and TORU docking support.]*

Fyodor also closed out the recent (4/18) periodic audit/health check of all stationary lighting fixtures (SD) in the RS by tagging up with ground specialists to discuss some uplinked questions. *[The audit involved 17 lights in SM, 12 in FGB, and three in DC-1. For the health check, the crew used a functioning reference lamp and a reference power supply to test lighting fixtures with one or two faulty lamps and failed power supplies.]*

Sunita Williams performed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Working from his voluntary "as time permits" task list, Kotov updated/edited the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Also off the discretionary task list, Oleg did the regular downloading of system data/log files from the Russian payload server (BSPN) to the RSS1 laptop and onto a FlashCard, to be dumped to the ground via OCA for analysis. *[The data transfer, required for periodic analysis of server condition, was preceded by a comm check between the RSS1 and the BSPN.]*

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), RED resistive exercise device (FE-2) and VELO bike with bungee cord load trainer (CDR/MBI-8, FE-1/MBI-8).

Later today, Suni will copy the crew's exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM

storage medium (done six times a week).

Ground specialists are discussing the details of the upcoming sleep cycle shift required by the crew to support Progress 24P docking on 5/15 (~1:12am EDT).

*Update on Russian LiOH:* Energia/Moscow has requested to use certified-life-expired RS LiOH (Lithium Hydroxide) canisters for Carbon Dioxide removal before they are disposed of. The use of these filters started last Friday (5/4). The Russian Vozdukh CO<sub>2</sub> removal system continues to operate at the same time. The U.S. CDRA (CO<sub>2</sub> Removal System) will not be activated unless needed.

*Update on Saturday Science:* For the voluntary “Saturday Science” program next weekend, payload scientists have offered Suni the choice of five options for video taping, including three EPO (Education Payload Operations) demos in which Fyodor & Oleg are welcome to participate, dealing with (1) “On-orbit Hobbies” (crew discussing their favorite hobbies while on ISS), (2) an ISS Living Area Tour, and (3) EPO Activity Brainstorming (crew’s choice & recommendation. Two additional options are CFE ICF2 (Capillary Flow Experiment – Interior Corner Flow 2), and EMCH. Suni’s decision will be downlinked by Wednesday morning.

*Update on EarthKAM:* Messages of thanks and photos were uplinked from schools to the crew in appreciation of the recent successful EarthKAM session. A total of 66 education groups participated in the exercise (57 from USA, two each from Canada, Argentina & Japan, and 1 each from Germany, India and South Korea), representing 3895 students. Total number of photos taken & downlinked: 1757.

No CEO (Crew Earth Observation) photo targets uplinked for today.

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06/06/07 -- Russian EVA-19

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TBD -- US EVA-10,-11,-12 (Node 2, etc.)

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11/21/07 -- (NET) ATV-1 docking (opportunity)

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12/12/07 -- Progress M-62/27P launch

02/12/08 -- Progress M-63/28P launch

02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/06/07  
**Date:** Sunday, May 06, 2007 1:14:53 PM  
**Attachments:**

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**ISS On-Orbit Status 05/06/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Sunita Williams). Ahead: Week 3 of Increment 15.*

The two Russian crewmembers began their day with the standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, their first, using DCS-760 digital still cameras with 400 & 800mm lenses at Service Module (SM) windows 6 & 8 to take imagery of documented CEO Earth targets using manual focusing only. Afterwards, Oleg Kotov downlinked the obtained images to the ground for analysis, to be discussed at a subsequent tagup. *[The skill training prepares crewmembers for the bottomside mapping of the Orbiter at the arrival of STS-117/13A next June. During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Atlantis from SM windows 6 & 8, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

FE-2 Williams performed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

Yurchikhin is handling the first recharging of the new Motorola-9505 Iridium satellite phone brought up on Soyuz 14S, a monthly routine job. *[After retrieving it from its location in the TMA-10 descent module (BO), Fyodor initiated the recharging of its lithium-ion battery, a 30-min. process, monitoring the process every 10-15 minutes as it takes place. Upon completion, the phone will be returned inside its SSSP Iridium kit and stowed it back in the BO's operational data files (ODF) container.*

*The satphone accompanies returning ISS crews on Soyuz reentry & landing for contingency communications with SAR (Search-and-Rescue) personnel after touchdown. The Russian-developed procedure for the monthly recharging has been approved jointly by safety officials. During the procedure, the phone is left in its fire-protective fluoroplastic bag with open flap.]*

At ~12:45pm EDT, Sunita Williams powered up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 12:50pm conducted a ham session with students at Santa Rosa Junior College assembled at today's SRJC "Day Under the Oaks" in Santa Rosa, CA. *[SRJC is home to 40,000 students in the California wine country of Sonoma County located approx. 38 miles north of San Francisco and also the home of W6SRJ – one of the "telebridge" stations for ARISS (Amateur Radio on ISS) school contacts. "Day Under the Oaks" is the annual open house for prospective students, teachers, and the community. The event attracts over 10,000 visitors and is held on the 110 acre main campus which has hundreds of majestic oak trees with classic ivy covered brick buildings. Some of the oaks and other tree specimens were planted by renowned botanist Luther Burbank. "What kind of research will be done on the space station (ISS) once it is completed in 2010?"; "What challenges do you face while you're in space without any gravity?"; "You participated in the Anomalous Long Term Effects on Astronauts Experiment (ALTEA) - have you seen the results of this experiment yet and what could be the cause of the light flashes?"; "Describe what you like best about being in space?"; "We visited NASA in Houston last month and saw the astronaut training area. What are some differences between training here and doing the real thing up in space?"; "Since you hold records for number of spacewalks and total time spent on spacewalks by a woman, can you tell us about what kind of jobs you perform while on your spacewalks?"; "Was it more or less effort to run the Boston Marathon from Space?"; "For fun, do you ever run up the walls and do stunts like in the "Matrix" movie?"]*

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1).

Working off his voluntary "time permitting" task list, FE-1 Kotov completed another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Sony PD-150P camcorder from SM window #7 to obtain data on the development of bio-productive processes in the areas of sea-ice melting and frontal areas of the Northern Atlantic. *[Photo targets were color bloom patterns in the ocean, swirls, water level drop, smoothing lanes in the wake of waves, and highly pronounced cloud cover anomalies in the Gulf of Mexico, the Gulf of St. Lawrence, and off-shore waters of Newfoundland Island & Northwest*

*Africa.]*

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/05/07  
**Date:** Saturday, May 05, 2007 2:57:23 PM  
**Attachments:**

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**ISS On-Orbit Status 05/05/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 15 crew CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Sunita Williams, except for regular maintenance & voluntary work. Day 146 in space for Suni (launched 12/10/06 on STS-116). >>>Space Day: Today 46 years ago (1961), the first U.S. Astronaut, Navy Commander Alan “Big Al” Shepard Jr., launched into a suborbital flight of 15 minutes duration, reaching an altitude of 116 miles. This restored faith in the U.S. space program only 23 days after the Soviet space program launched cosmonaut Yuri Gagarin into orbit around the planet.<<<*

The crew conducted the regular weekly 3-hr task of thorough station cleaning. [*“Uborka”, done routinely on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE’s sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.*]

For today’s voluntary “Saturday Science” program, Sunita Williams selected another session with the LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System) experiment. After setting up the payload equipment, the FE-2 completed her third run of LOCAD swabbing operations. The activities were videotaped and the equipment stowed afterwards. [*LOCAD uses small, thumb-sized “microfluidic” cartridges that are read by the experiment reader. The cartridges contain dried extract of horseshoe crab blood cells and colorless dye. In the presence of the bacteria, the dried extract reacts strongly to turn the dye a green color. Therefore, the more green dye, the more microorganisms there are in the original sample. The handheld device tests this new analysis technology by*

*sampling for the presence of gram negative bacteria in the sample in about 15 minutes. Lab-on-a-Chip technology has an ever-expanding range of applications in the biotech industry. Chips are available (or in development) which can also detect yeast, mold, and gram positive bacteria, identify environmental contaminants, and perform quick health diagnostics in medical clinics. The technology has been used to swab the MERs (Mars Exploration Rovers) for planetary protection. With expanded testing on ISS, this compact technology has broad potential applications in space exploration--from monitoring environmental conditions to monitoring crew health. Today's was the second of five operating sessions to be done on ISS.]*

CDR Yurchikhin performed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Working off the Russian voluntary job list, Yurchikhin also conducted a session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature.

*[Today's Uragan photo targets were the Mzymta river valley, Trans-Caucasian motorways from Alagir and Vladikavkaz, the Volga alluvial plain & Volga river delta, Taiwan mountain valleys, panoramic view of Zakarpatskaya Oblast (i.e., Trans-Carpathian Region), the Ugra river alluvial plain from its confluence with Oka near Kaluga, the Aral Sea (nearby dust storms), Lake Issyk-Kul, the Caucasus mountain range, and the Kolka glacier.]*

A second item from the "time permitting" task list for Fyodor and Oleg was a "refresher" session with the Russian "Profilaktika" (MBI-8, "Countermeasures") preventive health maintenance fitness program, to develop their proficiency with the -100 gas analyzer and Cardiocassette-2000 unit. Activities centered on performing a test gas analysis of exhaled air. *[MBI-8 normally uses the TEEM-100M with breathing mask, a blood lactate test with the ACCUSPORT analyzer and REFLOTRON-4 accessories, plus a subjective evaluation of physical exertion levels during the test (using the Borg Perceived Exertion Scale, viz., 10 steps from very light over hard and very hard to maximum). Results are entered on a log sheet. TEEM and ECG (electrocardiograph) data are transferred to the Laptop 3, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results are generally also called down to specialists standing by at TsUP.]*

A third discretionary task list job for Oleg Kotov was to use the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for*

ECON.]

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1). *[The RED canister pulley cables have exceeded their certified life of 53,515 cycles (based on life cycle testing results & safety controls), shortly before they are scheduled for replacement next week (5/8). Until then, the crew is to inspect the cords prior to each exercise session (as usually done in the monthly inspections). After the replacement, the canisters need to be load calibrated. (Last time done: 3/5/07).]*

Afterwards, Suni copied Fyodor's, Oleg's and her own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:50am EDT, the crew supported Russian PAO with four scripted TV downlinks ("Earth", "Water", "Air", "Fire") for taping at TsUP-Moscow, to be played on June 16 at a 12-hr school marathon concert event by the Department of Education of West Sussex, England UK, called "Elements".

At ~6:30am, Sunita Williams used the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) to hold a ham session with high school science students at Liceo Scientifico Statale "Lorenzo Respighi" in Piacenza, Italy. *["Why is it important to do experiments and research in the ISS rather than in any lab on Earth?"; "How can you sleep without gravity?"; "Do you have any private space inside the ISS?"; "Would you like to go on a mission to Mars?"]*

At ~9:40am, Williams had a second ham radio exchange with students at the Erweiterte Realschule Weiskirchen, Germany. *["Is it possible to recognize buildings on Earth from the ISS?"; "When did you last take a shower?"; "If someone falls ill aboard the ISS, how can they receive help?"; "Do you snore more or less in weightlessness of space than you do on Earth?"]*

At ~1:25pm, the crew the crew convened for their weekly teleconference with ISS Program Management at JSC/Houston via S-band/audio.

At ~2:02pm, Suni conducted a third amateur radio session, this time with visitors attending Space Day 2007 celebrations at the National Air & Space Museum in Washington, DC. *[Persons will be selected from the audience (mainly students) to ask the questions.]*

## **Weekly Science Update** (*Expedition Fifteen -- 2<sup>nd</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Problem with data acquisition from 3/15 to 4/5. Inc14 close-out activities occurred on 4/15, during which memory cards were exchanged. After a PCMCIA card check performed on 4/23, it appeared that ALTEINO did not record data from 3/15 to 4/5. There is confirmation that the ALTEINO device properly recorded data from 4/15 to 4/23. Science team is currently investigating the impact on future planning of activities.

*ANITA:* Planned.

*BCAT (Binary Colloidal Alloy Test):* Reserve.

*CARDIOCOG-2:* First session currently initially scheduled on 4/14, but a power cable could not be found on orbit. Trying to locate the hardware later on was not successful. ESA and Russian entities plan to upload a new cable on Progress 25P to support the second CARDIOCOG session (NLT approx. 6/9).

*CFE (Capillary Flow Experiment):* VG-2: During this operation of CFE, Suni completed the second operation (2 of 3) for the CFE Vane Gap vessel 2. The experiment was performed flawlessly and all specified science objectives were met. In this run Suni collected what is called hysteresis data for the critical vane wetting phenomena by first rotating the vane 360deg CW then 360deg CCW gathering critical wetting angles en route. The data collected was highly repeatable and precise and has provided the opportunity to specify the final test matrix for the vessel. The final run will specify a 180deg CW vane rotation followed by a 180deg CCW rotation with finer increments near the critical vane wetting angles. ICF-2: FE-2 completed all nominal operations for this experiment. Following immediate review of the downlink video it was realized that due to several planned but “lucky” bubble tests, not only was Suni able to collect the bulk migration data sought, but also determined the limits of the geometry to separate and coalesce bubbles. It is obvious from experiments like these how a container or conduit shape can be exploited to passively sift and merge bubbles from flows in low-g fluid systems. There are many applications for this work and the data collected will serve as a benchmark for analyses which include a much wider class of container types.

*CHROMOSOME-2 (E14 SFP):* Pre-/post-flight samples have been delivered to science team.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* GHAB Side 2 was activated successfully on 4/25. With this activation,

the seeds were placed a little further into the gel hoping to encourage the roots to grow within the gel instead of on top of the gel as they did on Side 1. No change in the seeds has been seen yet but it is anticipated that germination will occur in the next few days. Students in grades 1–6 started observing the downlinked images on 4/30 and are comparing to seeds they are germinating in their classrooms. Live worms can still be seen in CHAB1, but sadly no movement has been detected yet in CHAB2.

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* EarthKAM has received over 1757 images from the last session. Over 1300 students from 66 schools in 7 countries participated.

*EPO (Educational Payload Operation) Kit C:* Planned.

*IMMUNO (Saliva Sampling):* Planned.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Based on the complete set of data from LOCAD session 2, it was found that only 1 out of 8 CV (coefficient of variation) values were >25%, compared with 6 out of 12 for session 1. Higher CV values mean more variation between sample wells. “We like to see them <25%; so this is a very good sign.” The sample EU (endotoxin units) readings were clustered close together, an average of 0.062 +/- 0.007. 2 out of 4 of the recovery values were inside the 50-200% range, compared with 0 out of 6 for session 1. Although the 'recovery %' numbers are not as important as the other values, they are an indication of how the detection reaction is inhibited/enhanced by other chemicals in the sample.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 “Pirs”.

*MULTIGEN-1:* Planned

*MUSCLE (E14 SFP):* Daily paper questionnaires, sent to science team for assessment. Complete.

*MSG-SAME (Microgravity Science Glovebox):* Planned.

*NEOCYTOLYSIS (E14 SFP):* Pre-/post-flight samples have been delivered to science team.

*NOA-2 (Nitric Oxide Analyzer):* NOA pouch could not be located. Under

investigation by Russian team. This pouch needs to be located before the next Russian EVA, currently planned on 5/29.

*NUTRITION:* Planned.

*SAMPLE:* First crew sampling session performed on 4/9. Second session performed on 4/13. Once returned on ground, the temperature data loggers were read and apparently *SAMPLE* samples could have experienced freezing temperature. This would have a major negative science impact, and is still under assessment.

*SAMPLE (E14 SFP):* Surface sampling currently scheduled on 4/13. Once returned on ground, the temperature data loggers were read and apparently *SAMPLE* samples could have experienced freezing temperature. This would have a major negative science impact, and is still under assessment.

*SAMS/MAMS (Space & Microgravity Acceleration Measurement Systems):* Ongoing.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Planned.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*CEO (Crew Earth Observations):* Through 4/26 the ground has received a total of 254 ISS/CEO images for review and cataloging for Increment 15. Target requests with acquired imagery this week are: the Somalia Coast, the Pinacates Biosphere, and the Tigris-Euphrates Delta. "Your views of Somalia confirmed that there was no significant green-up to the vegetation associated with the recent El Nino Event. Your Pinacates views were excellent and complete our seasonal monitoring requirements. Your Tigris-Euphrates Delta shots had more clouds than we expected and lacked completeness of coverage further northwest. We will ask for this one again. You are off to an excellent start for your increment".

Today's CEO (Crew Earth Observation) photo targets were **Tenoumer Impact Crater, Mauritania** (*this crater [1.9 km diameter] is so young in geological terms [only 200,000 years] that it still looks pristine and uneroded. Relatively low sun angles of this pass should reveal details of the impact crater. Center point 22.9N 10.4W*), and **Quarkiz Impact Crater, Algeria** (*this small 3.5 km diameter is <70*

million years old. The crater is relatively easy to locate since it impacted a narrow zone of sinuous, dark rocks on the south side of the Atlas Mts. Center point 29N 7.5W).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:33am EDT [= epoch]*):

Mean altitude -- 337.3 km

Apogee height -- 344.4 km

Perigee height -- 330.1 km

Period -- 91.28 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0010595

Solar Beta Angle -- -34.0 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 88 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48402

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/11/07 -- Progress M-60/25P launch (11:25pm)

05/15/07 -- Progress M-60/25P docking (SM aft port, ~1:12am)

05/30/07 -- Russian EVA-18

06/06/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch

08/18/07 -- Progress M-61/26P docking (DC1)

08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15 launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing

10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks

TBD -- US EVA-10,-11,-12 (Node 2, etc.)  
11/04/07 -- (NET) ATV-1 launch/Ariane V  
11/21/07 -- (NET) ATV-1 docking (opportunity)  
12/06/07 -- (NET) STS-122/Atlantis launch -- Columbus Module, ICC-Lite  
12/12/07 -- Progress M-62/27P launch  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS  
04/24/08 -- (NET) STS-124/Discovery launch – JEM PM “Kibo”, racks, RMS.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/04/07  
**Date:** Friday, May 04, 2007 2:16:47 PM  
**Attachments:**

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### **ISS On-Orbit Status 05/04/07**

All ISS systems continue to function nominally, except those noted previously or below.

In support of ISS science, CDR Yurchikhin installed the geophysical GFI-1 Relaksatsiya ("relaxation") experiment from six GFI-1 hardware kits, reconfigured the payload Laptop 3 for the experiment and mounted the UV (ultraviolet) camera with spectrometer unit (SP) at Service Module (SM) window #9. Purpose of the ~2.5hr experiment was to contribute to a space/time study of radiation patterns from the Earth atmosphere and surface from UV spectra recorded with the camcorder. Afterwards the equipment was stowed again. *[Relaksatsiya normally deals with the study of the chemoluminescent chemical reactions and atmospheric light phenomena (emissions, i.e., molecular relaxation processes), including those that occur during high-velocity interaction between the exhaust products from space vehicles and the atmosphere at orbital altitude and during the entry of space vehicles into the Earth's upper atmosphere.]*

As she did recently for the MSG (Microgravity Science Glovebox) rack as well as ER3 (EXPRESS Rack 3), FE-2 Williams today worked on the ER5 and ER1 racks to replace their old ThinkPad 760XD laptops with the newer A31p, then checking out the installation. Afterwards, Williams initiated the upload of new RIC (Rack Interface Controller) Rev. 5 software on ER5 & ER1, later closing out the activity. *[The 760XDs were put in stowage as spares.]*

With the BITS2-12 onboard telemetry measurement system and VD-SU control mode deactivated (~11:23am - 11:40am EDT), which in turn required powering down Elektron and other RS systems, FE-1 Kotov worked on finishing the repair of the Russian SKV1 air conditioner. *[After reviewing procedural steps for the re-installation of the BTA heat exchanger-evaporator, Kotov performed its installation in the SKV1, supported by ground specialist tagup. Testing of the SKV1 will be*

*conducted by the ground. Recent troubleshooting efforts on SKV-1 included flushing the BTA wicks with water to ensure they are wet and wicking condensate properly.]*

Afterwards, Yurchikhin supported the reactivation of the Elektron O<sub>2</sub> generator at 32A, monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Sunita Williams did the regular bi-weekly maintenance reboot of the SSC (Station Support Computer) File Server and OCA Comm Router laptops as well as the weekly reboot of the PCS (Portable Computer System) A31p laptops.

Returning to the BSA (Battery Storage Assembly) in the "Quest" Airlock, Suni terminated the discharge process on the second of two sets of EMU (Extravehicular Mobility Unit) batteries (#2031, #2036), initiated on 5/2. *[The batteries will be required for the 13A spacewalks. The periodic maintenance consists of fully discharging and then recharging the storage units to prolong their useful life. After the end of the maintenance cycle, Suni restored the SSC laptop, which is used in DOS mode for the automated procedure, to nominal ops.]*

Yurchikhin performed the periodic checkout/verification of IP-1 airflow sensors in the various Russian segment hatchways, including the FGB-to-Soyuz 14S, FGB-to-Node and DC1-to-Progress 24P passages.

The FE-2 had 85 min. to set up and conduct another soldering session of the Soldering in Reduced Gravity Environment (SoRGE) experiment, one of the SDTOs (Station Development Test Objectives). *[SoRGE studies solder joints created in micro-G. Solder joints produced in micro-G exhibit approximately three times more voids (defects) on average compared with those produced in normal gravity, because without gravity gas bubbles (from solder flux or water vapor) form pores or void defects in solder joints and can reduce their strength. For SoRGE operations, Sunita solders small electronic components using the ISS soldering iron to validate the results observed in aircraft parabola testing, including potential mitigation techniques for reducing solder joint voids.]*

Williams also performed another periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub>

Monitoring Kit). Batteries were to be replaced if necessary. *[Purpose of the 10-min. activity is to correlate the hand-held readings with MCA (Major Constituents Analyzer) readings. CSA-CP measurements were gathered with the 12A.1-delivered units #1044 (prime) & #1051 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1007 for CO<sub>2</sub> in SM (panel 449) and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1044, and returned to their regular locations.]*

Sunita completed the regular FFQ (Food Frequency Questionnaire), her 19<sup>th</sup>, on the MEC (Medical Equipment Computer). By means of these FFQs, astronauts keep a personalized log of their nutritional intake over time on special MEC software. *[Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Additionally, Suni performed the routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), Oleg Kotov updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The FE-2 had time reserved for checking out the Kenwood amateur radio equipment in the SM, to verify its settings. *[During the end of Expedition 13, the Kenwood D700 VHF ham transceiver had become misconfigured. Today's job, originally on Suni's discretionary "job jar" task list, was to determine the current settings of the radio. The Ericsson radio in the FGB served for recent ham sessions.]*

Oleg and Fyodor again had an hour each allocated for ISS familiarization & adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

At ~4:10am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~6:45am, Fyodor and Oleg linked up with TsUP-Moscow stowage specialists via

S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Discussions today concerned the current whereabouts of an IELK (Individual Equipment & Liner Kit) and Soyuz seat liner, a newly found cable with connectors, type of bags used to collect trash, and stowage location of a spare Kazbek-U seat restraint system.]*

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio is scheduled at 3:10pm.

The crew also reviewed scripts for a major PAO TV downlink scheduled for tomorrow, arranged by TsUP-Moscow for the Department of Education of West Sussex, UK, to address a "marathon" school event on June 16.

TsUP/Moscow conducted standard hardware testing on the automated passive Kurs-P rendezvous & approach radar system in the SM AO (Assembly Compartment) on both subsets (strings). *[The test included powering the Kurs system heaters for approx. 3 hrs then powering the system ORUs to perform a self-test. Following the self-test the Kurs system and heaters were powered down. The SM aft port, currently vacant, will be used by Progress 25P for docking on 5/15.]*

Today's CEO (Crew Earth Observation) photo targets were **Roundabout Fire, southern Georgia** *(this major fire sprang up on 4/27 and is still burning, with a long plume oriented south in satellite imagery. The crew was to shoot the source area to capture the burn scar. The fire [with others] has given rise to regional smoke haze: looking further off track [east and south] to image the sharp front between the haze and clear air), and **Sudbury Impact Crater, Ontario** (this crater was formed almost 2 billion years ago and has been heavily distorted since into an oval shape by geological forces. The mining city of Sudbury is located in the center of the crater. Visual cue is Lake Wanapitei, downtrack of Sudbury impact crater [Wanapitei is also an impact crater feature, which was successfully imaged recently].)*

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<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

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Eccentricity -- 0.0010716  
Solar Beta Angle -- -32.7 deg (magnitude increasing)  
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Mean altitude loss in last 24 hours -- 95 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48386

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07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks  
TBD -- US EVA-10,-11,-12 (Node 2, etc.)  
11/04/07 -- (NET) ATV-1 launch/Ariane V  
11/21/07 -- (NET) ATV-1 docking (opportunity)  
12/06/07 -- (NET) STS-122/Atlantis launch -- Columbus Module, ICC-Lite  
12/12/07 -- Progress M-62/27P launch  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS  
04/24/08 -- (NET) STS-124/Discovery launch – JEM PM "Kibo", racks, RMS.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/03/07  
**Date:** Thursday, May 03, 2007 1:08:23 PM  
**Attachments:**

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### **ISS On-Orbit Status 05/03/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-1 Kotov started his workday with a major 2.5-hour IFM (in-flight maintenance) in the FGB module: testing the circuits of a temperature sensor on one of the six Blok 800-A batteries (#1). *[The tests, with the "Elektronika" MMTs-01 Multimeter, were run after TsUP-Moscow had shut down the unit with its ZRU charge/discharge unit and given the Go-ahead. The obtained measurement readings were then reported to TsUP.]*

For the annual housekeeping/re-certification of the European MSG (Microgravity Science Glovebox), FE-2 Williams first activated the A31p MLC (MSG Laptop Computer), then worked her way through the individual certification steps. The checkout went well. *[Steps included MSG activation and warm-up, checkout of the MSG's temperature sensors without & with MTL (Moderate Temperature Loop) cooling, checkout of the two delta-pressure sensors by on/off switching of the three AHU (Air Handling Unit) fans which provide negative pressure inside the WV (Work Volume) to prevent escape in case of a leak, system inspections, WV cleaning, returning MSG back to delta-P Sensor 1 mode, switching it to Standby, and finally deactivating and reconfiguring the A31p.]*

For the second day with the Russian Plasma-ISS (Bridge-2) experiment, prepared yesterday, CDR Yurchikhin had ~2h to configure systems & modes, make calibrations, then conduct measurement operations. *[Using Russian Laptop 3 and the "Relaksatsiya" (Relaxation) spectrometer & video camera at SM PkhO (Service Module Transfer Compartment) window 12, the experiment registered luminosity values of the Xenon jet from the U.S. PCU1 (Plasma Contactor Unit 1) on the Z1 truss when reaching the 2A/4A SAWs (Solar Array Wings). To support the activity, PCU1 was turned on by MCC-H at 4:00am EDT. Also turned on for taking plasma*

*measurements (without crew involvement) was the FPMU (Floating Point Measurement Unit), installed on the S1 truss by Jeff Williams & Thomas Reiter last year on Expedition 13 (8/3/06).]*

With the SKV-2 air conditioner temporarily deactivated, Oleg Kotov primed the BRPK-2 air/liquid condensate separator apparatus of the SRVK-2M condensate water processor by using a “Kolos-5D” hand pump to pressurize the BRPK’s membrane tank to remove any water and air in the condensate transfer line from the separator into an empty EDV container.

Yurchikhin performed maintenance on an older-design BRPK unit from spares, modifying it by replacing its pipeline with a new line without filter or safety valve (which have caused fluid backflow via a bypass line during condensate evacuation). The unit was then put back in stowage, as were the old pipeline and the tools.

The FE-2 performed a brief inspection of the OGS (Oxygen Generation System) rack, in response to questions from ground specialists troubleshooting some noise of its WDS (Water Delivery System) heard during operation.

Sunita Williams spent some time on the three SODF (Station Operations Data File) Caution & Warning Books, updating them with new procedures pages and double-checking them for accuracy.

Oleg Kotov performed the routine maintenance of the SM’s SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables. Today’s SOZh maintenance also included the replacement of a converter for measuring humidity partial pressure in the IK0501 gas analyzer. *[IK0501 is an automated system for measuring CO<sub>2</sub>, O<sub>2</sub>, and H<sub>2</sub>O in the air as well as the flow rate of the gas being analyzed.]*

Afterwards, Kotov conducted the periodic collection of air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Working on the IMS (Inventory Management System), the FE-1 also updated/edited its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Williams worked on the SAMS (Space Acceleration Measurement System),

checking out the filters of all SAMS drawers and using the vacuum cleaner to clean their screens.

At the HRF1 (Human Research Facility 1) rack, Sunita deactivated the MedOps cardiac defibrillator and conducted its periodic checkout. (Last time done: 3/8/07). *[This routine maintenance task is scheduled as soon as possible from Expedition start and every 60 days thereafter. For the checkout, the defib is connected to the 120V outlet, equipped with its battery and then allowed to charge, for about five seconds, to a preset energy level (e.g., 100 joules). After the button-triggered discharge, a console indicator signals success or failure of the test. The pacing signal is downlinked via S-band for 1 min. To check on possible aging of the CRT (cathode ray tube) display screen, today's maintenance included photo documentation by Suni. The HRF was afterwards powered down.]*

Sunita also "revisited" and closed out the experiment results of the last LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System) payload sessions by retrieving their media slides from the incubation bag, recording temperature values from the latter and taking photographs of the colonies on slides. Afterwards they were discarded as wet trash.

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Later today, Suni will copy Fyodor's, Oleg's and her own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Oleg and Fyodor again had an hour each allocated for ISS familiarization & adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

At ~11:05am EDT, the crew conducted two PAO TV interview events,- one with WCVB-TV Boston, MA, the other with Reston Communications.

At ~12:45pm, the crew held a teleconference via Ku- & S-band with the next ISS/ Expedition 15 crewmember, Clay Anderson, who will replace FE-2 Sunita Williams in June on 13A. *[These exchanges have the purpose to begin the handover process prior to the arrival on orbit of the next crew, through videocons and data exchanges between the current crew and the upcoming crew.]*

Last night (3:30pm-10:00pm), MCC-H powered up the RWS (Robotics Work Station) and SSRMS (Space Station Remote Manipulator System) to collect FMS (Force & Moment Sensor) data. The data gathered will support the characterization of the SSRMS FMS which is important for eventual operations of the Japanese JTV (H2 Transfer Vehicle). No crew involvement was required.

*Update on SKV1:* Yesterday's wick wetting on the BTA heat exchanger of the Russian SKV1 air conditioner showed good results (i.e., it produced condensate, drawn from it with a hand pump). The crew prepared the wicks for additional soaking for improved performance. The BTA is scheduled to be re-installed into SKV1 tomorrow (5/4).

*Update on EMCH:* Elastic Memory Composite Hinge fifth run yesterday was judged very successful (PI to crew: "The experiment has proved the worst-case scenarios for colder temperature hinge deployments"). However, Sunita was unable to transfer the experiment data from the EMCH internal memory to the ER (EXPRESS Rack) laptop. While the original plan was to transfer data every 5<sup>th</sup> run, EMCH has more than enough internal memory to store data from its entire program of 20+ runs. Ground teams are assessing the transfer issue.

*Update on TVIS Noise:* A temporary noise from the TVIS treadmill reported yesterday by Suni at the beginning of her run was tentatively identified by ground engineers as being caused by the SLD (Subject Loading Device) releasing tension, after inadvertently being left loaded at the end of the preceding run. *[For their treadmill workouts, crewmembers can select desired subject load settings for their SLD harness on the TVIS Control Panel. SLD loading can also be bypassed.]*

Today's CEO (Crew Earth Observation) photo targets were **Eastern Tien Shan, China** (*glacier tongues are being monitored in this new, but remote CEO site. Images of the linear mountain range are requested for the first time, looking right of track. More detailed images will be requested as the summer advances*), **London, England, Great Britain** (*nadir pass. Land use changes are rapid in UK's capital city. Developments around the city's margins are of greatest interest, especially as land use becomes more intense [smaller plot sizes, loss of open land]*), **Berlin, Germany** (*looking a touch left for Germany's capital. As one of the most wooded major cities, it is less apparent to the eye than many in Europe. Again, the margins of the city are of greatest mapping interest*), and **Florida Coastal Everglades** (*from this pass just offshore, aiming left beyond the coastal corridor of dense urban development for the Everglades. A mapping swath parallel with track was requested*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:30am EDT [= epoch]*):

Mean altitude -- 337.4 km  
Apogee height -- 344.7 km  
Perigee height -- 330.2 km  
Period -- 91.28 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0010777  
Solar Beta Angle -- -30.9 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 97 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48371

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/11/07 -- Progress M-60/25P launch (11:25pm)  
05/15/07 -- Progress M-60/25P docking (SM aft port, ~1:12am)  
05/30/07 -- Russian EVA-18  
06/06/07 -- Russian EVA-19  
06/08/07 -- “Not earlier than” (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks  
TBD -- US EVA-10,-11,-12 (Node 2, etc.)  
11/04/07 -- (NET) ATV-1 launch/Ariane V  
11/21/07 -- (NET) ATV-1 docking (opportunity)  
12/06/07 -- (NET) STS-122/Atlantis launch -- Columbus Module, ICC-Lite  
12/12/07 -- Progress M-62/27P launch

02/12/08 -- Progress M-63/28P launch

02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS

04/24/08 -- (NET) STS-124/Discovery launch -- JEM PM "Kibo", racks, RMS.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/02/07  
**Date:** Wednesday, May 02, 2007 1:55:04 PM  
**Attachments:**

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**ISS On-Orbit Status 05/02/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-1 Oleg Kotov serviced the BMP (Harmful Impurities Removal System) in the Russian segment (RS), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The bake-out will be terminated at ~5:00pm EDT before bedtime. Filter channel #1 was regenerated on 4/30. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

FE-2 Williams conducted the third EMCH (Elastic Memory Composite Hinge) session. Activities consisted of activating the experiment and conducting operations using hinge assemblies 1, 2 and 3 under changed test parameters. The EMCH hardware was later deactivated and returned to stowage. Yesterday's second run was successful, showing "the robustness of the hinges" (PI). *[Elastic memory technology may eliminate the need for highly complex deployment mechanisms in spacecraft structures by providing a simpler, lightweight alternative. The experiment uses six elastic memory hinges made from a unique resin and carbon fiber laminate, moving an attached mass at one end and measuring force & torque on the hinge plus the accuracy of deployment. The hinges were folded on the ground for deployment in space. A resistive heater, embedded in the EMC laminates in the hinge, provides the heat necessary for actuation, requiring 12 watts of power for 2-3 minutes. A proximity sensor attached at the end mass determines the final position upon deployment. A second motion sensor measures the deployment vs. time history. Sunita's job was to apply power to the experiment, wait for the hinges to reach the appropriate temperature and then activate each hinge individually. Video and photo documentation of deployments is required. The test articles are re-settable (with heat) to allow for multiple deployments.]*

CDR Yurchikhin worked on the Russian RSS1 laptop, replacing software for the BSPN payload server on the hard disk with a new load, then testing communications between RSS1 and BSPN, supported by ground specialist tagup.

After yesterday's R&R (removal & replacement) of the failed RPCM (Remote Power Controller Module) LAB2B\_E in the Lab's aft endcone, Williams today verified the successful repair by checking out the Lab C&W (Caution & Warning) panel annunciator lights. *[One of the RPCM's control switches (RPC5) had tripped four times since an initial trip on 12/15/06, then failed open. As a result, the Lab C&W panel lights have remained dark. Analysis of the data indicated the trips were due to a known defect in the FCH (Field Effect Transistor [FET] Controller Hybrid) component of this particular RPCM type.]*

Afterwards, Sunita updated the SODF POC (Station Operations Data File/ Portable Onboard Computers) book by replacing four pages with new uplinked procedures.

As next step in the current major IFM (inflight maintenance) efforts on the failed Russian SKV1 air conditioner, FE-1 Kotov flushed the evaporator wicks of the BTA heat exchanger which he removed yesterday from the SKV1 assembly. *[As suspected, one of the wick layers (the middle) was dry. Drying out of the wicks, which makes them ineffective, has been observed with this hardware before. The crew wetted the wicks with water and let the BTA sit overnight. After today's flushing, the BTA is to be reinstalled tomorrow (Thursday) and tested.]*

Sunita Williams checked out the U.S. Sound Level Meter (SLM) instrument and then used it to conduct the periodic noise level measurements program in the station interior for a 2 hr acoustic survey, later transferring the recorded data to the MEC (Medical Equipment Computer). *[A total of 48 acoustic measurements were obtained at 13 locations in the Lab (including in the TESS {Temporary Sleep Station} with door closed), three locations in the DC1 Docking Compartment, and 15 locations in the SM. The survey also included three crew preference locations taken at their perceived loudest locations in the station. The SLM gives instantaneous noise levels and their frequency spectra, which are transferred to the MEC laptop via an RS232 cable and later downlinked with regular CHeCS (Crew Health Care Systems) data dump or via OCA.]*

Returning to the BSA (Battery Storage Assembly) in the "Quest" Airlock, Suni terminated the discharge process on the first of two sets of EMU (Extravehicular Mobility Unit) batteries (#2059, #2060) initiated on 4/30, then started it on the second set (#2031, #2036). *[The batteries will be required for the 13A spacewalks. The periodic maintenance consists of fully discharging and then recharging the storage units to prolong their useful life. After the end of the maintenance cycle, Suni will restore the SSC laptop, which is used in DOS mode*

*for the automated procedure, to nominal ops.]*

Yurchikhin set up Laptop 3 and the Russian “Relaksatsiya” (Relaxation) spectrometer & video camera at the SM PkhO (Service Module Transfer Compartment)’s window 12 for tomorrow’s scheduled session of the Plasma-ISS (Bridge-2) experiment, his first. *[The experiment is aimed at registering luminosity values of the Xenon jets from the U.S. PCUs (Plasma Contactor Units) on the U.S. Z1 truss when they reach the 2A/4A SAWs (Solar Array Wings).]*

Oleg and Sunita performed the CHeCS CMO (Crew Health Care Systems/Crew Medical Officer) on-board training drill, a 30-min. video & audio refresher course to hone the CMO’s acuity in emergency medical operations. *[Today’s proficiency drill, guided by a number of training videos and concluding with a self-assessment questionnaire, focused on re-familiarization with skills and techniques required in procedures related to eye treatment, medication administration, and fractures & dislocations.]*

The FE-2 conducted the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Sunita also completed the periodic CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout on the prime unit (#1044) and backup unit (#1051). *[Suni changed out the prime unit’s battery, then zero-calibrated both instruments. Following zero calibration, the backup unit was stowed, while the prime unit’s datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

Continuing the current round of the monthly preventive maintenance of RS ventilation systems, CDR Yurchikhin today took on the preventive maintenance on the ventilation system in the DC1 (Docking Compartment) by cleaning its PF1 & PF2 filters and the V1 & V2 filter grilles plus the VD1 & VD2 air ducts.

Oleg Kotov undertook the periodic (about twice a month) replenishing of the Elektron’s water supply for electrolysis, filling the KOV thermal loops’ EDV container with water from one of the U.S. CWCs (Contingency Water Containers), collected by the Lab CCAA (Common Cabin Air Assembly). *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Fyodor Yurchikhin meanwhile had 3 hrs reserved to start the regular transfer of liquid waste from five filled EDV-U urine containers to the BV2 tank of the Progress 24P cargo ship, then flushing the lines with water. *[Each of the Progress' two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before receiving the liquid waste.]*

Oleg performed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), Suni updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1). *[The RED canister pulley cables have exceeded their certified life of 53,515 cycles (based on life cycle testing results & safety controls), shortly before they are scheduled for replacement next week (5/8). Until then, the crew is to inspect the cords prior to each exercise session (as usually done in the monthly inspections). After the replacement, the canisters need to be load calibrated. (Last time done: 3/5/07).]*

Later today, Suni will copy Fyodor's, Oleg's and her own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Fyodor and Oleg again had an hour each allocated for ISS familiarization & adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

At ~5:20am EDT, the crew downlinked two PAO TV messages of greetings to TsUP-Moscow: (1) to the participants of the 6<sup>th</sup> Annual Youth Delphian Games of Russia "Great Dates. Great People" in Yaroslavl on May 18-23 in celebration of 50 Years Sputnik 1, 100<sup>th</sup> birthday of S.P. Korolev, 150<sup>th</sup> birthday of K.E. Tsiolkovsky, and "our beloved Seagull" Cosmonaut Valentina Vladimirovna Tereshkova (born in Yaroslavl, 1937), and (2) as a get-ahead for next week's Victory Day (May 9), the 62<sup>nd</sup> Anniversary of the end of World War II, the ISS crew downlinked a message of

greetings to the veterans of WWII (Russian: "Great Patriotic War"), videotaped at TsUP/Moscow for later replay.

Today's CEO (Crew Earth Observation) photo targets were **Jamestown, Virginia** (*images were requested for the 400<sup>th</sup> anniversary of settlement of this historic site. ISS flew over Richmond, VA, and the crew was to aim right of nadir down the James River. Jamestown lies on an island that protrudes well into the river*), **Jornada Basin, New Mexico** (*monitoring of subtle changes in vegetation and surface soils is well handled with modern remote sensing. This sensitive area near a major urban area is changing in many ways. Nadir images were requested just left of track. The site lies just east of the Rio Grande, the main visual cue from orbit, and just north of El Paso*), and **Sevilleta Wildlife Area, New Mexico** (*this site overlapped with the site above. Continuing shooting for spring-season imagery looking just left of track. This monitoring site also lies in the heavily disturbed Rio Grande corridor [and just east of the Rio Grande, the main visual cue]*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:07am EDT [= epoch]*):

Mean altitude -- 337.5 km

Apogee height -- 344.9 km

Perigee height -- 330.2 km

Period -- 91.28 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0010908

Solar Beta Angle -- -28.7 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 123 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48355

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/11/07 -- Progress M-60/25P launch (11:25pm) **[time added]**

05/15/07 -- Progress M-60/25P docking (SM aft port, ~1:12am) **[time added]**

05/30/07 -- Russian EVA-18

06/06/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks  
TBD -- US EVA-10,-11,-12 (Node 2, etc.)  
11/04/07 -- (NET) ATV-1 launch/Ariane V  
11/21/07 -- (NET) ATV-1 docking (opportunity)  
12/06/07 -- (NET) STS-122/Atlantis launch -- Columbus Module, ICC-Lite  
12/12/07 -- Progress M-62/27P launch  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS  
04/24/08 -- (NET) STS-124/Discovery launch – JEM PM “Kibo”, racks, RMS.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 05/01/07  
**Date:** Tuesday, May 01, 2007 12:59:18 PM  
**Attachments:**

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### **ISS On-Orbit Status 05/01/07**

All ISS systems continue to function nominally, except those noted previously or below.

At 2:00am EDT, crew day began with the routine checkup of Docking Compartment (DC1) circuit breakers and fuses. *[The monthly checkup in the "Pirs" DC1 looks at AZS circuit breakers on the BVP Amp Switch Panel (they should all be On) and the LEDs (light-emitting diodes) of 14 fuses in Fuse Panels BPP-30 & BPP-36.]*

FE-2 Williams began her workday with the second session of the new EMCH (Elastic Memory Composite Hinge) experiment which studies the performance of an advanced type of composite hinge to determine its suitability for use in space. Activities consisted of activating the payload and conducting operations using hinge assemblies 1, 2 and 3. The PI's initial look at the results of yesterday's first run indicates that it was successful. *[Elastic memory technology may eliminate the need for highly complex deployment mechanisms in spacecraft structures by providing a simpler, lightweight alternative. The experiment uses six elastic memory hinges made from a unique resin and carbon fiber laminate, moving an attached mass at one end and measuring force & torque on the hinge plus the accuracy of deployment. The hinges were folded on the ground for deployment in space. A resistive heater, embedded in the EMC laminates in the hinge, provides the heat necessary for actuation, requiring 12 watts of power for 2-3 minutes. A proximity sensor attached at the end mass determines the final position upon deployment. A second motion sensor measures the deployment vs. time history. Sunita's job is to apply power to the experiment, wait for the hinges to reach the appropriate temperature and then activate each hinge individually. Video and photo documentation of deployments is required. The test articles are re-settable (with heat) to allow for multiple deployments.]*

Williams also prepared for her next SLEEP (Sleep-Wake Actigraphy & Light

Exposure During Spaceflight) session by saving data from her Actiwatch and then re-initializing the device before stowing it. She also downloaded Lopez-Alegria's watch data via its Reader to the HRF1 laptop for subsequent downlink to the ground, closing out this Inc-14 activity for Mike L-A. The HRF1 (Human Research Facility 1) rack was powered down later in the day. *[The NASA/JSC experiment investigates the effects of long and short duration spaceflight on sleep, objectively evaluates sleep through measurement of sleep-wake activity, subjectively evaluates crewmembers' satisfaction with the amount and quality of sleep, and measures crewmembers' light exposure during spaceflight to investigate association with sleep disruption. To monitor Sunita's sleep/wake patterns and light exposure, her special Actiwatch device measures the light levels encountered by her as well as her patterns of sleep and activity throughout the Expedition.]*

Sunita's main task today was the R&R (removal & replacement) of the failed RPCM (Remote Power Controller Module) LAB2B\_E in the aft endcone of the Lab. *[The elaborate job required powering down racks, an UOP power outlet and the DDCU (DC-to-DC Converter Unit) LA2B for safing, followed by removing stowed hardware from the LAB1P6 rack (for CCAA/LT TCS), then unfastening and rotating the rack out of the way for access to the endcone. The resulting numerous RPC power-downs impacted a large number of avionics and other core systems for the ~2 hr. duration of the IFM, involving EPS (Electrical Power Systems), Communications (no audio comm between USOS & RS (Russian segment) or between RS and the ground via S-band, and no Ku-band), plus some MCS (Motion Control System) and ECLSS (Environment Control & Life Support Systems) subsystems. After the R&R, Suni spent more time on rotating the rack back up, reconfiguring its stowage, and powering up systems. In preparation for the R&R, MCC-H on 4/27 executed a swap of the onboard backup and standby C&C MDMs (Command & Control Multiplexer/Demultiplexers), followed by configuring the C&W (Caution & Warning) function in the new backup computer.]*

FE-1 Kotov deactivated the BITS2-12 onboard telemetry measurement system and VD-SU control mode (which in turn required powering down Elektron and other RS systems), after which he and CDR Yurchikhin had ~3 hrs scheduled for major IFM (inflight maintenance) on the defunct SKV1 air conditioner. *[Today's work focused on disconnecting its BTA heat exchanger unit from the system's compressor and condenser assembly and then deinstalling the BTA. The activity was supported by ground specialist tagup.]*

Afterwards, the Elektron O<sub>2</sub> generator was reactivated at 32A, with Williams monitoring the external temperature of its secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line*

*(which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Later, the CDR ran another internal pressure check on the spare BZh Liquid Unit (#056) for the Elektron, to check for hermeticity. The unit was charged by Mikhail Tyurin on 4/6 with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#21), for the second time. *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

CDR Yurchikhin began a new round of the monthly preventive maintenance of RS ventilation systems in the FGB (*Funktsionalnyi-Grusovoi Blok*), cleaning the screens of the TsV1 & TsV2 fans. Afterwards, Fyodor moved to the Service Module (SM) to perform the cleaning job on its “Group C” ventilator screens and heat exchanger grilles.

Oleg Kotov started a new round of preparing condensate water (KAV) for the Elektron by transferring U.S. Lab-collected water from a 30-liter CWC (Contingency Water Container, #1054) via the electric condensate pumping unit (BPK) through a 20-micron condensate filter to the EDV container until full. *[The transfer is a preliminary KAV purification stage to remove contaminants of 20 microns or larger from condensate collected in the USOS before connecting the EDV to the Russian water processing system (SRV-K2M) for further processing.]*

Kotov also performed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), the FE-1 also updated/edited its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

In addition, Oleg performed the weekly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), checking the condition of the roller bearings and record its time & date values.

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (FE-1, FE-2) and VELO bike with bungee cord load trainer (CDR). *[CDR and FE-1 were informed that today's TVIS exercise sessions were the last for them requiring SPDs (Subject Positioning Devices), but with their choice left up to them.]*

Later today, Suni will copy Fyodor's, Oleg's and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Fyodor and Oleg again had an hour each allocated for ISS familiarization & adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

At ~1:40pm EDT, the crew was scheduled to downlink a PAO TV address on the occasion of the Queen of England's visit to NASA's Goddard Space Flight Center. The downlink also was to include a generic welcome message from the Expedition 15 crew for use at NASA Visitors Centers around the U.S. and video for use as promo "tease" on NASA TV and the nasa.gov website.

A new list of suggested activities for the voluntary "Saturday Science" program on 5/5 was uplinked for Suni's choice, to be made by tonight. *[The two choices are (1) the third run of CFE VG2 (Capillary Flow Experiment – Vane Gap 2), or (2) the third session with the LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System) payload.]*

Today's CEO (Crew Earth Observation) photo targets were **Ouarkziz Impact Crater** (*ISS had a nadir pass over this approximately 3.5 km diameter impact structure. Aiming for a clear circular crater within the NE-SW trending ranges of Algeria. Suggested was an overlapping, nadir mapping series taken along-track as the station approached the mountains*), **London, England, Great Britain** (*weather was predicted to be clear over London, giving the crew an opportunity to record land use/land cover change in the city related to construction for the 2012 Olympics. ISS had a near-nadir pass trending W to E, and high-resolution imagery of the eastern portion of the city is of particular interest as this is where construction activities are centered*), and **Florida Coastal Everglades** (*clear weather was predicted for the southern Florida peninsula. The crew's orbit track afforded them a nadir pass over the southern Florida Coastal Everglades Long Term Ecological Research [LTER] site. High resolution mapping along-track as the ISS passed over the Everglades is useful for tracking changes in wetland configuration and vegetation density*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:44am EDT [= epoch]*):

Mean altitude -- 337.7 km

Apogee height -- 345.1 km

Perigee height -- 330.3 km

Period -- 91.29 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0011011

Solar Beta Angle -- -26.0 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 150 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48339

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)

05/30/07 -- Russian EVA-18

06/06/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch

08/18/07 -- Progress M-61/26P docking (DC1)

08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15 launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing

10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks

TBD -- US EVA-10,-11,-12 (Node 2, etc.)

11/04/07 -- (NET) ATV-1 launch/Ariane V

11/21/07 -- (NET) ATV-1 docking (opportunity)

12/06/07 -- (NET) STS-122/Atlantis launch -- Columbus Module, ICC-Lite

12/12/07 -- Progress M-62/27P launch

02/12/08 -- Progress M-63/28P launch

02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS

04/24/08 -- (NET) STS-124/Discovery launch -- JEM PM "Kibo", racks, RMS.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/30/07  
**Date:** Monday, April 30, 2007 2:01:09 PM  
**Attachments:**

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### **ISS On-Orbit Status 04/30/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 2 of Increment 15 (Inc-14 lasted 30 weeks).*

FE-1 Oleg Kotov conducted the periodic regeneration of the Russian Harmful Impurities Removal System (BMP) by starting the "bake-out" cycle to vacuum on absorbent bed #1 of the dual-channel filtration system. The bake-out will be terminated at ~4:25pm EDT, before sleep time. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

After a ten-minute teleconference with LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System) payload specialists and setting up the experiment equipment, FE-2 Sunita Williams completed the second run of LOCAD-PTS operations, using a sampling procedure updated from the first session on 3/31. The activities were videotaped and the equipment stowed afterwards. *[LOCAD uses small, thumb-sized "microfluidic" cartridges that are read by the experiment reader. The cartridges contain dried extract of horseshoe crab blood cells and colorless dye. In the presence of the bacteria, the dried extract reacts strongly to turn the dye a green color. Therefore, the more green dye, the more microorganisms there are in the original sample. The handheld device tests this new analysis technology by sampling for the presence of gram negative bacteria in the sample in about 15 minutes. Lab-on-a-Chip technology has an ever-expanding range of applications in the biotech industry. Chips are available (or in development) which can also detect yeast, mold, and gram positive bacteria, identify environmental contaminants, and perform quick health diagnostics in medical clinics. The technology has been used to swab the MERs (Mars Exploration Rovers) for planetary protection. With expanded testing on ISS, this compact technology has broad potential applications in space*

*exploration--from monitoring environmental conditions to monitoring crew health. Today's was the second of five operating sessions to be done on ISS.]*

Williams also performed the first session of the new EMCH (Elastic Memory Composite Hinge) experiment which studies the performance of an advanced type of composite hinge to determine its suitability for use in space. Activities consisted of transferring the 12A.1-delivered payload from its EXPRESS Rack locker, setting it up at the outside of the rack and then operating it. *[Building new spacecraft structures in space necessitates deploying (unfolding) items that have been launched from Earth. Elastic memory technology may eliminate the need for highly complex deployment mechanisms by providing a simpler, lightweight alternative. The experiment involves six elastic memory hinges made from a unique resin and carbon fiber laminate, to move an attached mass at one end and measuring force & torque on the hinge plus the accuracy of deployment. The hinges were folded on the ground for deployment in space. A resistive heater, embedded in the EMC laminates in the hinge, provides the heat necessary for actuation, requiring 12 watts of power for 2-3 minutes. A proximity sensor attached at the end mass determines the final position upon deployment. A second motion sensor measures the deployment vs. time history. Sunita's job is to apply power to the experiment, wait for the hinges to reach the appropriate temperature and then activate each hinge individually. Video and photo documentation of deployments is required. The test articles are re-settable (with heat) to allow for multiple deployments.]*

CDR Fyodor Yurchikhin conducted an inventory/audit of RS SSVP (Russian Segment Docking & Internal Transfer System) components, checking the contents of various kits listed in the IMS (Inventory Management System) and restowing them per uplinked specifications.

Yurchikhin then removed the docking mechanism (StM, *Stykovochnovo mekhanizma*) between Progress M-59/24P and the DC1 Docking Compartment. *[The StM is the "classic" probe-and-cone type, consisting of an active docking assembly (ASA) with a probe (SSh), which fits into the cone (SK) on the passive docking assembly (PSA) for initial soft dock and subsequent retraction to hard dock. The ASA is mounted on the Progress' cargo module (GrO), while the PSA sits on the docking ports of the SM, FGB and DC1.]*

With the passageway to 24P thus freed, FE-1 Oleg Kotov and the CDR had five hours between them to unload the resupply ship, transfer its cargo to the ISS and update the IMS accordingly.

Afterwards, Kotov performed routine IFM (in-flight maintenance) on the SRVK-2M condensate water processor by removing its multifiltration/purification column unit (BK), which has reached its service life limit. The old BK was replaced with

a new unit and stowed as trash (last time replaced: 2/26/07). *[BK contains five purification columns to rid the condensate of dissolved mineral and organic impurities and has a service lifetime of ~450 liters throughput. The water needs to be purified for proper electrolysis in the Elektron O<sub>2</sub> generator.]*

FE-2 downloaded remaining IWIS (Internal Wireless Instrumentation System) data to SSC (Station Support Computer) laptop preparatory to downlink via OCA, then powered down IWIS RSUs (Remote Sensor Units) and returned the equipment to stowage.

Williams also performed today's routine maintenance of the Service Module's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Working on the IMS, Sunita updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Fyodor and Oleg again had an hour each allocated for ISS familiarization & adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

Working on the BSA (Battery Storage Assembly) in the "Quest" Airlock, Suni initiated the 85-day maintenance cycle on the first of two sets of EMU (Extravehicular Mobility Unit) batteries (#2059, #2060). *[The batteries will be required for the 13A spacewalks. The periodic maintenance consists of fully discharging and then recharging the storage units to prolong their useful life. After end of the maintenance cycle, Suni will restore the SSC laptop, which is used in DOS mode for the automated procedure, to nominal ops.]*

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1).

Later today, Suni copies Fyodor's, Oleg's and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 11:07am EDT [= epoch]*):

Mean altitude -- 337.8 km  
Apogee height -- 345.2 km  
Perigee height -- 330.3 km  
Period -- 91.29 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0011079  
Solar Beta Angle -- -22.9 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 180 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48326

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
05/30/07 -- Russian EVA-18  
06/06/07 -- Russian EVA-19  
06/08/07 -- “Not earlier than” (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks  
TBD -- US EVA-10,-11,-12 (Node 2, etc.)  
11/04/07 -- (NET) ATV-1 launch/Ariane V  
11/21/07 -- (NET) ATV-1 docking (opportunity)

12/06/07 -- (NET) STS-122/Atlantis launch -- Columbus Module, ICC-Lite  
12/12/07 -- Progress M-62/27P launch  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS  
04/24/08 -- (NET) STS-124/Discovery launch -- JEM PM "Kibo", racks, RMS.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/29/07  
**Date:** Sunday, April 29, 2007 12:43:29 PM  
**Attachments:**

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### **ISS On-Orbit Status 04/29/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Sunita Williams). Ahead: Week 2 of Increment 15 (Increment 14 lasted 30 weeks).*

FE-2 Williams took about 3.5 hrs of her free time for another “Weekend Science” session, first setting up and testing the CFE ICF2 (Capillary Flow Experiment/ Interior Corner Flow 2) hardware, then running the operations and later tearing the equipment down and putting it back in stowage with the MWA and camcorder. The experiment was recorded on three Mini-DVCAM tapes. *[CFE has applications to the management of liquid fuels, cryogenes, water-based solutions and thermal fluids in spacecraft systems. ICF is one of three CFE experiments, the others being Vane Gap (VG) and Contact Line (CL). Each of the CFE experiments is represented with two unique experimental units (1,2), all of which use similar fluid-injection hardware, have simple and similarly sized test chambers, and rely solely on video for highly quantitative data. Silicone oil is the fluid used for all the tests, with different viscosities depending on the unit. Differences between units are primarily fluid properties, wetting conditions, and test cell cross section.]*

CDR Yurchikhin performed today’s routine maintenance of the Service Module’s SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush counter (SPK-U) and water supply (SVO) readings for calldown to TsUP/Moscow.

At ~11:10am EDT, Suni Williams had a PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

The crew worked out on their regular 2.5-hr. physical exercise program (about half

of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1).

Working off his voluntary "time permitting" task list, FE-1 Kotov completed another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the Sony PD-150P camcorder, to record high production zones of Phytoplankton (April-May being the period of most intensive blooming of Phytoplankton in the North Atlantic waters). *[Photo targets were color bloom patterns in the ocean, swirls, water level drop, smoothing lanes in the wake of waves, and highly pronounced cloud cover anomalies in the Caribbean, English Channel, Gulf of St. Lawrence and Bay of Biscayne.]*

Also from the discretionary "job jar", CDR Yurchikhin conducted another session with the Russian "Uragan" earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature. *[Today's Uragan targets were the Pamir mountains with the Medvezhy glacier, the South shore of Lake Baikal, Sakhalin Island, the Caucasus and Sochi, the Caspian Sea, the Volga-Akhtubinsk alluvial plain, Aral Sea with dust storms, Altai mountains, Katun biosphere park, Irkut river, the alluvial plain of the Don river, the Kursk steppe, Zakarpatskaya Oblast, and Yuri Gagarin's landing site south of the city of Engelsk.]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:38am EDT [= epoch]):

Mean altitude -- 338.0 km

Apogee height -- 345.2 km

Perigee height -- 330.8 km

Period -- 91.29 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0010683

Solar Beta Angle -- -19.5 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 20 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48308

**Significant Events Ahead** (*all dates Eastern and subject to change*):

05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
05/30/07 -- Russian EVA-18  
06/06/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks  
TBD -- US EVA-10,-11,-12 (Node 2, etc.)  
11/04/07 -- (NET) ATV-1 launch/Ariane V  
11/21/07 -- (NET) ATV-1 docking (opportunity)  
12/06/07 -- (NET) STS-122/Atlantis launch -- Columbus Module, ICC-Lite  
12/12/07 -- Progress M-62/27P launch  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS  
04/24/08 -- (NET) STS-124/Discovery launch – JEM PM "Kibo", racks, RMS.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/28/07  
**Date:** Saturday, April 28, 2007 3:43:48 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 04/28/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 15 crew CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Sunita Williams, except for regular maintenance & voluntary work. Day 139 in space for Suni (launched 12/10/06 on STS-116).*

The crew conducted the regular weekly 3-hr task of thorough station cleaning. *["Uborka", done routinely on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

FE-1 performed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Kotov also undertook the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from two CWCs (Contingency Water Containers, #1066, #1029) collected by the Lab CCAA (Common Cabin Air Assembly). *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

At ~9:05am EDT, the crew had their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

FE-2 Williams concluded the first session for Inc-15 (the 26<sup>th</sup> aboard ISS) of the EarthKAM (Earth Knowledge Acquired by Middle School Students) experiment from the University of California in San Diego, by deactivating, tearing down and stowing the hardware. *[EarthKAM was activated on 4/23 to continue getting students interested in math and science and to inspire this next generation of explorers. The session was another great success: Over 1300 students from 66 schools in seven countries participated in this run. The payload operated without crew intervention, using a Kodak ESC 460C electronic still camera with 50mm or 180 mm lens, powered by 16Vdc from a 28 Vdc adapter, taking pictures by remote operation from the ground. It was available for students who submitted image requests and conduct geographic research. The requests were uplinked in a camera control file to the IBM A31p SSC laptop which then activated the camera at specified times and received the digital images from the camera's storage card on its hard drive, for subsequent downlink via OpsLAN.]*

Sunita also completed the regular FFQ (Food Frequency Questionnaire), her 18<sup>th</sup>, on the MEC (Medical Equipment Computer). By means of these FFQs, astronauts keep a personalized log of their nutritional intake over time on special MEC software. *[Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

The crew worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1).

Later today, Suni will copy L-A's, Misha's, and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off the Russian voluntary job list, Yurchikhin conducted a session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets, including those showing man-made impacts on nature. *[Today's Uragan photo targets were the Altai mountains, Lake Baikal, glaciers of the Caucasus, Kolka glacier, the Caspian Sea, the Volga river delta, the Aral Sea, the Danube river delta, the alluvial plain of the Don river, the Alps, Allaline glacier, and Ugra National Park.]*

Also suggested on the task list for Fyodor: taking photographs of MLI (multi-layer insulation) of the Soyuz TMA-10, docked to the FGB nadir port, from the DC1 EVA hatch window, to assess the condition of the spacecraft's insulation.

A discretionary task list job for Oleg was to use the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

At ~10:50am EDT, Suni had her weekly PFC (Private Family Conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

*Reboost Update:* This morning's ODU propulsion system test and station reboost by the SM orbital maneuvering (main) engines at 6:40am EDT was on time and nominal. Mean orbital altitude of the ISS was lifted by 4.18 km (2.25 n.mi.), as predicted (within 1%). The burn produced a delta-V of 2.42 m/s, boosting mean orbital altitude to 337.9 km, with 350.5 km apogee & 325.3 km perigee height of the slightly elliptical orbit. Each of the two regeneratively cooled rocket engines, arranged left and right of the currently unoccupied aft docking port, produces a thrust of 315 kgf (694 lbf); they can be fired independently or simultaneously.

Purpose of the burn was to set up proper phasing (orbital position) conditions for Progress 25P and STS-117/13A. Before the maneuver, at 5:15am, Sunita closed the Lab window shutters for protection against jet plume deposits and opened them again at ~9:35am.

### **Weekly Science Update** (*Expedition Fifteen -- 1<sup>st</sup>*)

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Reserve.

*CFE (Capillary Flow Experiment):* Reserve.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* GHAB Side 2 was activated successfully on 4/25. With this activation, the seeds were placed a little further into the gel hoping to encourage the roots to grow within the gel instead of on top of the gel as they did on Side 1. No change in the seeds has been seen yet but researchers anticipate that germination will occur in the next few days. Students in grades 1 - 6 will start observing the downlinked images on 4/30 and will compare to seeds they are germinating in their classrooms. Live worms can still be seen in CHAB1, but "sadly no movement has

been detected yet in CHAB2”.

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* As of 4/26, EarthKAM has received over 1500 images. Over 1300 students from 66 schools in 7 countries are participating.

*EPO (Educational Payload Operation):* Planned.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System):* Reserve.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* “Thanks so much for your attentiveness during our SPHERES test session” on 4/27. Early indication is that it yielded excellent data – “most likely four thesis worth of research!”

*CEO (Crew Earth Observations):* Ongoing.

Today's CEO (Crew Earth Observation) photo targets were **London, England, Great Britain** (*Saturday should have been be a relatively cloud free day. London has been in existence for at least 2000 years and today is one of the world's leading business, financial and cultural centers. The crew was to concentrate their attention on the eastern half of the metro area in order to capture the progress of construction related to the 2012 Olympic Games. High-resolution imagery of the rest of the metro area and urban/rural fringe is also desirable*), and **Sevilleta Wildlife Area, New Mexico** (*the main objective from the standpoint of CEO of these sites is a record of land cover/land use change on a seasonal basis. The Sevilleta LTER [Long Term Ecological Research] Project is located about 80 kilometers south of Albuquerque, New Mexico, in and around the Sevilleta National Wildlife Refuge [NWR]. The Refuge, which is managed by the US Department of the Interior, Fish and Wildlife Service, and its surroundings, are positioned at the intersection of several major biotic zones: Chihuahuan Desert grassland and shrubland to the south, Great Plains grassland to the north, Piñon-Juniper woodland in the upper elevations of the neighboring mountains, Colorado Plateau shrub-steppe to the west, and riparian vegetation along the middle Rio Grande Valley. Context mapping of the area was requested for this pass*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (*all dates Eastern and subject to change*):

- 05/12/07 -- Progress M-60/25P launch
- 05/14/07 -- Progress M-60/25P docking (SM aft port)
- 05/30/07 -- Russian EVA-18 **(date changed)**
- 06/06/07 -- Russian EVA-19 **(date changed)**
- 06/08/07 -- “Not earlier than” (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)
- 07/13/07 -- FGB solar array retraction
- 07/20/07 -- Progress M-60/25P undocking & reentry
- 07/24/07 -- US EVA-9
- 08/02/07 -- PMA-3 relocation
- 08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3
- 08/15/07 -- Progress M-59/24P undocking (DC1) & reentry
- 08/16/07 -- Progress M-61/26P launch
- 08/18/07 -- Progress M-61/26P docking (DC1)
- 08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*
- 10/01/07 -- Progress M-61/26P undocking (DC1)
- 10/02/07 -- Soyuz TMA-11/15 launch
- 10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)
- 10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing
- 10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks
- TBD -- US EVA-10,-11,-12 (Node 2, etc.)
- 11/04/07 -- (NET) ATV-1 launch/Ariane V
- 11/21/07 -- (NET) ATV-1 docking (opportunity)
- 12/06/07 -- (NET) STS-122/Atlantis launch -- Columbus Module, ICC-Lite
- 12/12/07 -- Progress M-62/27P launch
- 02/12/08 -- Progress M-63/28P launch
- 02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS
- 04/24/08 -- (NET) STS-124/Discovery launch – JEM PM “Kibo”, racks, RMS.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/27/07  
**Date:** Friday, April 27, 2007 2:16:55 PM  
**Attachments:**

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**ISS On-Orbit Status 04/27/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-2 Sunita Williams began her work day with another 2.5-hr session of the SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites) investigation which tests autonomous operations & multi-body formation flying of free-floating satellites within the ISS cabin. The FE-2 conducted Session 7, utilizing three SPHERES satellites, five beacons on mounts, tanks, batteries etc. *[The activity was recorded with the Sony PD100 camcorders and the Russian Sony HVR-Z1J high-definition camera. SPHERES demonstrates the basics of formation flight and autonomous docking, using beacons as reference for the satellites, to fly formation with or dock to the beacon. A number of programs define various incremental tests including attitude control (performing a series of rotations), attitude-only tracking, attitude and range tracking, docking with handheld and mounted beacons, etc. The payload consists of up to three self-contained 8-inch dia. free-floating satellites which perform the various algorithms (control sequences), commanded and observed by the crew members which provide feedback to shape algorithm development. Each satellite has 12 thrusters and a tank with CO<sub>2</sub> for propellant, which required the CDRA (Carbon Dioxide Removal Assembly) to be running. The first tests, in May 2006, used only one satellite (plus two beacons – one mounted and one hand-held); a second satellite arrived on ULF1.1, the third on 12A.1. Formation flight and autonomous docking are important enabling technologies for distributed architectures.]*

With CDRA no longer required after the SPHERES activity, the unit was deactivated by ground commanding starting at ~8:00am EDT. Afterwards, Williams disconnected the regular ITCS LTL (Internal Thermal Control System/Low Temperature Loop) coolant jumper connection to the LAB1D6 rack, which

supported CDRA ops.

CDR Yurchikhin took his turn today on the Russian PNEVMOCARD experiment, performing his first session (which forbids moving or talking during data recording). The experiment is controlled from the RSE-Med A31p laptop, equipped with new software, and uses the TENSOPPLUS sphygmomanometer to measure arterial blood pressure. FE-1 Kotov's turn was yesterday. *[PNEVMOCARD purports to obtain new scientific information to refine the understanding about the mechanisms used by the cardiorespiratory system and the whole body organism to spaceflight conditions. By recording (on PCMCIA cards) the crewmember's electrocardiogram, impedance cardiogram, low-frequency phonocardiogram (seismocardiogram), pneumotachogram (using nose temperature sensors), and finger photoplethysmogram, the experiment supports integrated studies of (1) the cardiovascular system and its adaptation mechanisms in various phases of a long-duration mission, (2) the synchronization of heart activity and breathing factors, as well as the cardiorespiratory system control processes based on the variability rate of physiological parameters, and (3) the interconnection between the cardiorespiratory system during a long-duration mission and the tolerance of orthostatic & physical activities at the beginning of readaptation for predicting possible reactions of the crewmembers organism during the their return to ground.]*

Yurchikhin, Kotov and Williams performed the mandatory CHeCS (Crew Health Care Systems) emergency/contingency medical OBT (on-board training) drill, a one-hour U.S. exercise designed to refresh crewmembers' acuity in applying HMS (Health Maintenance System) equipment like ACLS (Advanced Cardio Life Support) in an emergency. *[The drill gives crewmembers the opportunity to work as a team in resolving a simulated medical emergency onboard ISS and to refresh their memory of on-orbit stowage and deployment locations, equipment use, and procedures. Setting up (but not actually operating/manipulating) onboard equipment such as the RSP (Respiratory Support Pack), ALSP (Advanced Life Support Pack), intubation kit, HMS defibrillator, all stowed in the Lab CHeCS rack, and the CMRS (Crew Medical Restraint System), L-A and Suni stepped through the ACLS algorithm manual to resolve a simulated medical emergency onboard ISS. Objectives of the exercise include practicing communication and coordination necessary to perform medical emergency procedures, locating appropriate emergency medical components, and determining each crewmember's individual method of delivering CPR (cardio-pulmonary resuscitation) in zero-G.]*

In the Service Module (SM), FE-1 Kotov performed the periodic maintenance work of changing out major components of the toilet system (ASU), followed by a checkout of the ASU. *[Replaced with new units were the U-receptacle (MP) and filter insert (F-V) on the KTO solid waste container (not replaced), plus four hoses, two fittings and a sensor/annunciator. The old items were logged in the IMS*

*(Inventory Management System) database and stowed for disposal. (Last time done: 3/8).]*

With the Elektron O<sub>2</sub> generator and the BITS2-12 onboard telemetry measurement system turned off, CDR Yurchikhin performed a checkout of the recent BITS2-12 outfitting work done by Mikhail Tyurin. *[On 3/15, the E14 FE-1 had installed three insert-cables on the BITS2-12's power switching unit (BSK) behind SM panel 310 to power the onboard telemetry system's time sensor (DV2). Today's task was to check voltage readings (or their absence) on the DV2 time sensor's power bus and to verify the integrity of fuses in the automatic unit (TA0-75) which protects the DV2 from overloads.]*

Afterwards, the Elektron was reactivated at 32A, with Yurchikhin monitoring the external temperature of the secondary purification unit (BD) for the first 10 minutes of operations to ensure that there was no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

FE-2 Williams configured the ER1 (EXPRESS Rack 1) by connecting its MTL (Moderate Temperature Loop) cooling jumper QDs (quick disconnects) to the nearby LAB1O2 UIP (Utility Interface Panel, "Z-panel"), to prepare for the use of SAMS (Space Acceleration Measuring System) to monitor tomorrow's reboost maneuver #2 by the SM main engines.

Later, Sunita also turned on SAMS by activating its ICU (Interface Control Unit) laptop in rack LAB1P2 (Drawer 2) for taking structural dynamics (vibrational) data during the reboost.

As performed yesterday for the MSG (Microgravity Science Glovebox rack, the FE-2 today swapped ThinkPad laptops on ER3 (EXPRESS Rack 3), replacing the old 760XD with the newer A31p and checking the installation. The 760XD was put in storage as a spare.

Afterwards, Williams initiated the upload of new software on the ER3 RIC (Rack Interface Controller), later closing out the activity. *[Other software upgrades on the A31p laptops and RICs (Rack Interface Controllers) planned for the next few days involve ER5 and ER1.]*

While RIC uploading was underway, the FE-2 did the regular bi-weekly maintenance reboot of the SSC (Station Support Computer) File Server and OCA Comm Router laptops.

Sunita also completed another periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the hand-held CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries are to be replaced if necessary. *[Purpose of the activity is to correlate the hand-held readings with MCA (Major Constituents Analyzer) readings. CSA-CP measurements were gathered with the 12A.1-delivered units #1044 (prime) & #1051 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1007 for CO<sub>2</sub> in SM (panel 449) and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1044, and returned to their regular locations.]*

In addition, Suni retrieved and stowed the two FMKs (Formaldehyde Monitoring Kits) deployed by her on 4/25 in the Lab (below CEVIS cycle) and SM (most forward handrail).

Oleg Kotov removed a mislabeled equipment bag from FGB stowage and relabeled it, to reflect its current contents,- a Soyuz SOTR BVN (ventilation system fan & air heater assembly).

The CDR completed the daily routine maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM.

Fyodor also worked on the IMS, updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The crew is working out with the regular 2.5-hr. physical exercise protocol (about half of which is used for setup & post-exercise personal hygiene) on CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (CDR, FE-1, FE-2), and VELO bike with bungee cord load trainer (CDR).

Later today, Suni transfers the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Fyodor and Oleg again had an hour each allocated for ISS familiarization & adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard*

*requirement for new station occupants for the first two weeks.]*

At ~4:10am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~4:25am, Fyodor and Oleg linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Discussions today concerned the current whereabouts of memory sticks left on ISS inadvertently by Charles Simonyi, discarded electrical cords and cables, etc.]*

The crew's regular weekly tagup with the Lead Flight Director at JSC/MCC-H via S-band/audio is scheduled at 3:40pm.

Working from her discretionary "job jar" task list, Sunita Williams yesterday did the weekly CWC (Contingency Water Container) audit as part of on-going WDS (Water Delivery System) assessment of onboard water supplies. Other tasks waiting for her on the list are CEVIS PCMCIA card replacement, checking if the three SODF (Station Operations Data File) Warning books correctly reflect a recent update, performing an audit of rack restraints, and conducting another extended experiment soldering session with the SoRGE (Soldering in Reduced Gravity Experiment) Station Development Test Objective (SDTO).

*C&C MDM Swap:* At ~9:00am, MCC-H executed a swap of the onboard backup and standby C&C MDMs (Command & Control Multiplexer/Demultiplexers) and then configured the C&W (Caution & Warning) function in the new backup computer. *[The swap is required for the upcoming R&R (removal & replacement) of an RPCM (Remote Power Controller Module) in the Lab (LAB2B\_E).]*

*Reboost 2:* At 6:40am EDT tomorrow morning, the ISS will perform a second reboost burn using the two SM ODU orbit maneuvering engines which were test fired on 4/25. Planned delta-V = 2.4 m/s. The purpose is to set up proper phasing (orbital position) conditions for Progress 25P and STS-117/13A.

Today's CEO (Crew Earth Observation) photo targets were **Kara-Kul Impact Crater, Tajikistan** (*ISS had a near-nadir pass over this remote, geologically young [less than 5 million years old] impact structure. The impact structure is expressed on the landscape by a lake that fills the crater. Aiming to the right of track; suggested was an overlapping mapping series parallel to track*), and **Luquillo Forest, Puerto Rico** (*weather was predicted to be mostly clear over eastern Puerto Rico. The Luquillo forest is located in the northeastern portion of the island, and the LTER [Long Term Ecological Research] site there studies the responses of tropical*

*ecosystems to such things as storm-related disturbance. The station's nadir pass provided an opportunity for high-resolution mapping along-track.)*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:31am EDT [= epoch]*):

Mean altitude -- 334.1 km

Apogee height -- 345.8 km

Perigee height -- 322.4 km

Period -- 91.21 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0017412

Solar Beta Angle -- -12.0 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 80 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48277

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/28/07 -- Reboost burn 2 (SM ODU main engines; phasing); 6:40am.

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch

08/18/07 -- Progress M-61/26P docking (DC1)

08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15 launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing

10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks

TBD -- US EVA-10,-11,-12 (Node 2, etc.)  
11/04/07 -- (NET) ATV-1 launch/Ariane V  
11/21/07 -- (NET) ATV-1 docking (opportunity)  
12/06/07 -- (NET) STS-122/Atlantis launch -- Columbus Module, ICC-Lite  
12/12/07 -- Progress M-62/27P launch  
02/12/08 -- Progress M-63/28P launch  
02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS  
04/24/08 -- (NET) STS-124/Discovery launch – JEM PM “Kibo”, racks, RMS.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/26/07  
**Date:** Thursday, April 26, 2007 12:50:14 PM  
**Attachments:**

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### **ISS On-Orbit Status 04/26/07**

All ISS systems continue to function nominally, except those noted previously or below.

Right after wake-up, FE-2 Williams started Part 3 (of 5) of the periodic acoustic measurement protocol by recording post-sleep data of the crew-worn acoustic dosimeters, later deploying the dosimeters statically in the station for the duration of the day, then recording measurements this afternoon (~3:10pm EDT) and stowing the instruments. *[Acoustic data must be taken twice per Increment, each time for the duration of the 16-hour crew workday.]*

CDR Yurchikhin and FE-1 Kotov completed the installation of a new Russian payload server computer (BSPN), equipped with its own hard disk drive (HDD), and its thermal control unit (UTS) in the Service Module (SM), originally scheduled for Mikhail Tyurin on 3/5-6 and started yesterday by Kotov. *[Today's work, which included making the necessary connections to the BSPN, required switching the Vozdukh CO<sub>2</sub> scrubber to autonomous (automatic cycle control) mode and later returning it to manual mode 5, after activation of the BSV-M frequency & time synchronization unit, followed by turning on the VPO-11 instrument compartment fan behind panel 131, after Yurchikhin completed outfitting it with an airduct.]*

Setting up for today's checkout of the European MSG (Microgravity Science Glovebox) rack, FE-2 Williams powered up the MSG's A31p laptop, now loaded by ground commanding with the previous software version (2.8) after yesterday's false fire alarm, and prepared the vacuum test gear. Then, Sunita initiated the 3-hr leak test on the MSG WV (Work Volume), with the WV lights off to prevent temperature/pressure increases.

In the Service Module (SM), Sunita Williams configured the video equipment for

filming the subsequent workouts on the TVIS (Treadmill with Vibration Isolation & Stabilization), for biomechanical evaluation of the individual crewmembers and assessment of the hardware status by ground engineers. Later tonight, she'll dismantle and stow the video equipment.

Afterwards, Williams broke out and set up the OUM-PFE (Oxygen Uptake Measurement - Periodic Fitness Evaluation) equipment on the HRF-2 (Human Research Facility 2) rack to obtain measurements on herself on the CEVIS cycle ergometer according to protocol, with Fyodor Yurchikhin acting as OUM-PFE operator. The operations were documented with photo and video. In closing out, Suni updated the evaluation protocol, deactivated & stored the gear, including photo/video equipment, and turned off the OUM-PFE laptop. *[Until fully restored to service, the CEVIS must currently be operated with a manual control knob to adjust workload as required by protocols. For OUM-PFE, Fyodor was available to adjust the manual knob.]*

With the Elektron-VM oxygen (O<sub>2</sub>) generator deactivated, FE-1 Kotov conducted a leak check on the hydrogen (H<sub>2</sub>) dump line between its outlet at the Liquid Unit (BZh) and the ZLVK electropneumatic hydrogen vacuum valve to the external vent port. *[The leak check consists of pressurizing the pipe, which runs behind SM panels, with nitrogen (N<sub>2</sub>) from the N<sub>2</sub> purge unit (BPA) and monitoring any pressure drops over time.]*

Afterwards, the Elektron was reactivated at 32A, with Kotov monitoring the external temperature of the secondary purification unit (BD) for the first 10 minutes of operations to ensure that there is no overheating. *[During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Sunita transferred previously stored IWIS RSU (Internal Wireless Instrumentation System/Remote Sensor Unit) data to the SSC4 (Station Support Computer 4) laptop for subsequent downlink to the ground, then reconfigured and activated the IWIS in the Lab, Node, FGB and SM, pre-programming it for automatic recording structural vibrations data during the reboost maneuver on 4/28.

Oleg Kotov conducted the routine task of shooting two photos of the docking cone of the FGB nadir port's passive docking assembly (ASP-B), currently occupied by the Soyuz TMA-10/14S spacecraft, a standard practice after Russian dockings. These images are used to refine current understanding of docking conditions. Oleg later downlinked the pictures via OCA assets. *[The objective is to take photo*

*imagery of the scratch or scuff mark left by the head of the docking probe on the internal surface of the drogue (docking cone, ASP) ring, now rotated out of the passageway. Before shooting the picture, the cosmonaut highlights the scuffmark with a marker and writes the date next to it. As other crewmembers before him, the FE-1 used the Nikon D1X digital still camera to take two pictures with the hatch closed down.]*

Kotov also performed the periodic (monthly) functional closure test of a spare emergency vacuum valve (AVK) for the Vozdukh CO<sub>2</sub> removal system, in the spare parts kit. *[The AVKs are critical because they close the Vozdukh's vacuum access lines in the event of a malfunction in the regular vacuum valves (BVK) or a depressurization in the Vozdukh valve panel (BOA). Access to vacuum is required to vent carbon dioxide (CO<sub>2</sub>) during the regeneration of the absorbent cartridges (PP). During nominal operation, the AVK valves remain open.]*

The FE-1 unstowed and set up the equipment for the Russian PNEVMOCARD experiment, then performed his first session (which forbids moving or talking during data recording). The experiment is controlled from the RSE-Med A31p laptop, equipped with new software, and uses the TENSOPPLUS sphygmomanometer to measure arterial blood pressure. *[PNEVMOCARD purports to obtain new scientific information to refine the understanding about the mechanisms used by the cardiorespiratory system and the whole body organism to spaceflight conditions. By recording (on PCMCIA cards) the crewmember's electrocardiogram, impedance cardiogram, low-frequency phonocardiogram (seismocardiogram), pneumotachogram (using nose temperature sensors), and finger photoplethysmogram, the experiment supports integrated studies of (1) the cardiovascular system and its adaptation mechanisms in various phases of a long-duration mission, (2) the synchronization of heart activity and breathing factors, as well as the cardiorespiratory system control processes based on the variability rate of physiological parameters, and (3) the interconnection between the cardiorespiratory system during a long-duration mission and the tolerance of orthostatic & physical activities at the beginning of readaptation for predicting possible reactions of the crewmembers organism during the their return to ground.]*

Oleg completed the daily routine maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), Sunita updated/edited its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Suni also performed the scheduled lens change on the EarthKAM system at the Lab science window, going from 50mm to 180mm focal length. The lens change had to be performed on the night side while EarthKAM was not taking pictures. *[EarthKAM was activated on 4/23, and the current session is the 26<sup>th</sup> time aboard the ISS and the first time on Increment 15. The payload runs without crew intervention through Saturday (4/28). EK is using a Kodak ESC 460C electronic still camera with 50mm and 180mm lenses, powered by 16Vdc from a 28 Vdc adapter, taking pictures by remote operation from the ground, without crew interaction. It is available for students who submit image requests and conduct geographic research (107 schools are currently signed up for participation). The requests are uplinked in a camera control file to the ThinkPad A31p laptop which then activates the camera at specified times and receives the digital images from the camera's storage card on its hard drive, for subsequent downlink via OpsLAN.]*

The crew worked out with the regular 2.5-hr. physical exercise protocol (about half of which is used for setup & post-exercise personal hygiene) on CEVIS cycle ergometer (FE-2/OUM), TVIS treadmill (CDR, FE-1), and RED resistive exercise device (CDR, FE-1, FE-2).

Later today, Suni transfers the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At 3:35pm EDT, FE-2 Williams is scheduled for the periodic VHF1 emergency communications check over NASA's VHF (Very High Frequency) sites at Dryden (3:38-3:44pm), White Sands (3:39-3:46pm) and Wallops Island (3:47-3:51pm), talking with Houston/Capcom, MSFC/PAYCOM (Payload Operation & Integration Center Communicator) and Moscow/GLAVNI (TsUP Capcom) in the normal fashion via VHF radio from a handheld microphone and any of the U.S. segment ATUs (audio terminal units). *[Purpose of the test is to verify signal reception and link integrity, and to ensure minimum required link margin during emergency (no TDRS) and special events (such as a Soyuz relocation). Last time done: 3/12/07.]*

Fyodor and Oleg again have an hour each allocated for ISS familiarization & adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

After setting up the PAO television gear, at ~10:05am EDT the E15 crew was interviewed live by two media clients: USA Today (Traci Watson) & Washington Post On-line (Rocci Fisch), also aired on NASA-TV.

*EMU Spacesuit Contamination:* After a small amount of metal contamination was found at Hamilton Sundstrand in the high-pressure O<sub>2</sub> outlets of two test rigs, activities got underway on the ground to clear both ground and on-orbit EMUs (Extravehicular Mobility Units) before the latter can be used.

*Activity Look-ahead:* Over the next few days, the crew will be performing software upgrades on the A31p laptops and RICs (Rack Interface Controllers) of three EXPRESS Racks – ER3 (an ARIS rack), ER5 & ER1.

Today's CEO (Crew Earth Observation) photo targets were **Tigris-Euphrates Delta** (*weather was predicted to be clear over the delta coastline. ISS had a nadir pass over the coastline region; requested target was a mapping pass along-track to record the current configuration of land cover and land use in this portion of the delta*), **Sevilleta Wildlife Area, New Mexico** (*this Long Term Ecological Research [LTER] site is focused on desert ecosystem dynamics, particularly response of vegetation and soils to disturbance. A high-resolution nadir mapping pass along-track provides useful information for time-series change analysis*), and **Presqu'île Impact Crater** (*this impact structure was formed approximately 500 million years ago, and today is recognized on the landscape mainly by the Presqu'île Lake that has formed within the crater. ISS had a nadir pass over the center of the structure; an overlapping mapping series as the station approached and left the site area captured the 24-kilometer diameter impact structure*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 3:48am EDT [= epoch]*):

Mean altitude -- 334.2 km

Apogee height -- 345.8 km

Perigee height -- 322.5 km

Period -- 91.22 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0017406

Solar Beta Angle -- -7.9 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 180 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48258

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/28/07 -- Reboost burn 2 (SM ODU main engines; phasing)  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/16/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks **date changed**  
TBD -- US EVA-10,-11,-12 (Node 2, etc.)  
11/04/07 -- (NET) ATV-1 launch/Ariane V **added**  
11/21/07 -- (NET) ATV-1 docking (opportunity) **added**  
12/06/07 -- (NET) STS-122/Atlantis launch -- Columbus Module, ICC-Lite  
12/12/07 -- Progress M-62/27P launch **date changed**  
02/12/08 -- Progress M-63/28P launch **date changed**  
02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS  
04/24/08 -- (NET) STS-124/Discovery launch – JEM PM "Kibo", racks, RMS.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 04/25/07  
**Date:** Wednesday, April 25, 2007 3:00:21 PM  
**Attachments:**

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### **ISS On-Orbit Status 04/25/07**

All ISS systems continue to function nominally, except those noted previously or below. *Fyodor's and Oleg's first full work day in space.*

Before breakfast, FE-2 Williams began Part 1 (of 5) of the periodic acoustic measurement protocol by deploying crew-worn acoustic dosimeters, to be carried for 24 hours (with a microphone on the shirt collar). (Last time done: 2/15). *[Today around noon, after about 15 hours of measurements, dosimeter data were recorded and the hardware power-cycled for another data take starting tonight after 8.5-hr. sleep. At that point, the crew will deploy the dosimeters statically in the station for the duration of the day, record measurements tomorrow noon and stow the instruments. Acoustic data must be taken twice per Increment, each time for the duration of the 16-hour crew workday.]*

Also before breakfast and exercise, CDR Yurchikhin, FE-1 Kotov and FE-2 Williams completed their first (Sunita's fourth) session with the periodic Russian MedOps test "Hematokrit" (MO-10), measuring red cell count of the blood. *[The blood samples were drawn from a finger with a perforator lancet, then centrifuged in two microcapillary tubes in the M-1100 kit's minicentrifuge, and its hematocrit value was read off the tubes with a magnifying glass. It is a well-known phenomenon of space flight that red blood cell count (normal range: 30-45%) tends to go down over time. After the exam, the data were saved in the IFEP software (In-Flight Examination Program) on the MEC (Medical Equipment Computer), and Oleg Kotov stowed the equipment.]*

After FE-2 prepared the auditory test equipment, each crewmember took the periodic O-OHA (on-orbit hearing assessment) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC laptop application. It was Fyodor's and Oleg's first, Sunita's fifth session. *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure*

*levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month. Note: There have been temporary hearing deficits documented on some U.S. and Russian crewmembers, all of which recovered to pre-mission levels.]*

Sunita worked on the ESA MSG (Microgravity Science Glovebox) to prepare it for upcoming experiment activities. After first closing the Lab window shutters and replacing the rack's old IBM 760XD laptop with the newer A31p model, loaded with new MSG software, the FE-2 activated the MSG for its planned WV (Work Volume) leak test. Shortly thereafter, operations were interrupted by a fire alarm. The MSG was powered off and is currently unpowered. *[All indications point to a false smoke detector event caused by the new software (Vers. 2.9) loaded on the A31p laptop. Recovery plans for today are for Suni to revert to the old software load (Vers. 2.8), known to run on the A31p, and then to proceed with the important leak test.]*

The Expedition 15 crew performed the mandatory two-hour OBT (onboard training) emergency egress drill for the case of rapid cabin depressurization, with Russian and US specialists standing by at both control centers for crew questions or comments. The rule is that the emergency egress exercise should be performed by every new station crew once within seven days after departure of the previous crew. *[Background: Purpose of the drill is to (a) familiarize the station residents with the location of hardware and the positions of valves used in emergency situations, (b) work through the Russian Segment (RS) hardware deactivation procedures, (c) practice crew emergency joint activities, and (d) identify crew comments and suggestions that arise during training regarding crew procedures and equipment. In the RS, the crew translated along the emergency egress path to the FGB nadir port (where Soyuz TMA-10 is currently docked), checking hardware such as the Sokol suits, cable cutters, fire extinguisher (OKR), gas masks (IPK), emergency procedures books, valve settings, hatch rubber seal & restraint integrity, etc. In the US Segment (USOS) the inspection focused on fireports being unblocked in the Lab {21}, with other US modules to be checked by future crews), readiness of CSA-CP (Compound Specific Analyzer-Combustion Products), ISS leak kit, PBA (portable breathing assembly) and PFE (portable fire extinguisher), emergency procedures books, valve settings, integrity of hatch rubber seals, presence of hatch handrails, etc. The exercise was topped off by a thorough debrief with the ground via S-band. During the session, the crew simulated executing the planned emergency procedures while moving about the station. For the case of an onboard fire and for emergency descent, there are other mandatory*

*emergency drill OBTs.]*

In preparation for the R&R (removal & replacement) of the BRPK-2 condensate separation & evacuation unit, FE-1 Kotov performed a checkout of the Valve no. 3 (KI3) line of the separator setup. After TsUP/Moscow Go-ahead, Oleg completed the BRPK changeout, placing the old unit in temporary stowage and updating the IMS (Inventory Management System).

Later in the day, Kotov ran troubleshooting tests on the Russian SRV-K2M water processing system working jointly with the BPK condensate feed unit, essentially a pump, for checking out the pump's suspect performance when it is used to transfer condensate to SRV-K2M. BPK was determined to be operational but probably has a kinked hose (which may be replaced). *[The test required prior shutdown of the SKV2 air conditioner. The SRV-K2M normally receives condensate from the Russian SKV air conditioning units for processing. The condensate received from SKV is an air/water mixture which is then separated in the BRPK into water and air. The air is vented into the ISS cabin and the water collected in a small water tank (~180 ml). Water is then taken from that tank and sent through the BKO water purification column for processing into potable water. When a U.S. CWC (Contingency Water Container) is processed through this system for potable water, the BPK is used to pump the water into the CPB-K.]*

Working in the Service Module (SM) behind panel 131, CDR Yurchikhin rearranged Russian water treatment components, first unlocking the condensate collector tank (SBK1) and moving it to an open position on the right, then also transferring its associated local temperature sensor commutator (LKT TA251M) and its cabling. Activities were supported by ground specialist tagup. *[The relocation required deactivation of the BITS2-12 onboard measurement telemetry system and VD-SU control mode, which in turn required temporary powering down of Elektron (off/on by TsUP/Moscow), SKV2 (off/on by TsUP), Vozdukh (automatically off only if in automated mode), BMP (off/on automatically), and SRVK (off/on manually by crew or remotely by TsUP). This activity was originally scheduled on 3/5 for Mikhail Tyurin but deferred to today.]*

Also planned for Tyurin on 3/5 but deferred to today was Part 1 of the scheduled installation of a new Russian payload server computer (BSPN) and its thermal control unit (UTS) in the SM. Today's work consisted of tool preparation and assembly of the mounting bracket of the BSPN from individual components. *[More work is scheduled later, including bolting the BSPN to its bracket and installing the latter with its housing an air duct in the newly rearranged space behind panel 131.]*

Using the MultiMeter instrument set up by Suni Williams for temperature monitoring,

Oleg Kotov reactivated the Elektron-VM oxygen (O<sub>2</sub>) generator (turned off for Fyodor's plumbing IFM, see above) with the usual preceding nitrogen (N<sub>2</sub>) purge of the BZh-9 Liquid Unit and ground specialist tagup. *[Monitoring the external temperature of the secondary purification unit (BD) for the first 10 minutes of operationis to ensure that there is no overheating. During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Sunita conducted the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

In addition, Williams deployed two passive FMK (formaldehyde monitoring kit) sampling assemblies in the Lab (below CEVIS) and SM (most forward handrail), to catch any atmospheric formaldehyde on a collector substrate for subsequent analysis on the ground.

For the crew's subsequent workouts on the RED (resistive exercise device), Suni also set up the video camcorder for filming the sessions. *[The RED video, showing the apparatus on the "ceiling" hatch of the Node, is periodically required to support biomechanical evaluation of the exercising crewmember and assessment of the on-orbit setup of equipment during data collection.]*

The crew worked out with the regular 2.5-hr. physical exercise protocol (about half of which is used for setup & post-exercise personal hygiene) on CEVIS cycle ergometer (FE-1, FE-2), TVIS treadmill (CDR), and RED resistive exercise device (CDR, FE-1, FE-2)

Afterwards, Suni will transfer the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working on the IMS (Inventory Management System), Kotov will update/edit its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

At ~3:17pm EDT, Sunita Williams will power up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power

supply) and at 3:22pm conduct a ham session with students at Christian Life Elementary School in Rockford, Illinois. *[Christian Life Schools is a nationally accredited private school that serves Pre-K through 12<sup>th</sup> grade students, and its staff and faculty are certified teachers. "I have heard that you are growing plants up there. What kinds are you growing?"; "Has your view of life and the universe changed since you've been in space?"; "As technology progresses now, how long do you think it will be until we have bases on the moon"]*

*Reboost Update:* This morning's ODU propulsion system test and station reboost by the SM orbital maneuvering (main) engines was on time and successful. Mean orbital altitude of the ISS was lifted by 1.73 km (0.93 n.mi.), exactly as predicted. With a nominal performance, the burn had a duration of ~40 sec and produced a delta-V of 1.0 m/s (3.28 ft/s), boosting mean orbital altitude to 334.3 km, with 351.8 km apogee & 316.8 km perigee height of the slightly elliptical orbit. Approximately 70 kg of propellant was used. **This was the first time the two SM main engines were fired in 7 years.** Each of the regeneratively cooled rocket engines, arranged left and right of the aft docking port, produces a thrust of 315 kgf (694 lbf) and can be fired independently or simultaneously. Purpose of the burn was to test the SM engines and set up proper phasing (orbital position) conditions for Progress 25P and STS-117/13A. A second reboost maneuver is planned for 4/28 (Saturday) with a target delta-V of 2.0 m/s.

Today's CEO (Crew Earth Observation) photo target were the **Western Pamirs** (*a weather front is moving through the region; however, breaks in the cloud cover were predicted over the western Pamirs. Looking to the right of track for long valley glaciers among the westernmost ranges. Many of the glaciers have visible dark banding due to entrained debris along the tops and sides of the ice masses*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this noon, 1:55pm EDT [= epoch]*):

Mean altitude -- 334.3 km

Apogee height -- 346.2 km

Perigee height -- 322.5 km

Period -- 91.22 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0017641

Solar Beta Angle -- -3.7 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude gain in last 24 hours -- 1730 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48249

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/28/07 -- Reboost burn 2 (phasing)

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET), STS-117/Atlantis/13A launch (S3/S4 trusses)

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch

08/18/07 -- Progress M-61/26P docking (DC1)

08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15 launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing

10/20/07 -- (NET) STS-120/Discovery/10A launch -- Node 2, racks

Late Oct/early Nov -- US EVA-10,-11,-12

11/??/07 -- Progress M-62/27P launch

12/06/07 -- (NET) STS-122/Atlantis launch -- Columbus Module, ICC-Lite

01/29/08 -- Progress M-63/28P launch

02/14/08 -- (NET) STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS

04/24/08 -- (NET) STS-124/Discovery launch -- JEM PM "Kibo", racks, RMS.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/24/07  
**Date:** Tuesday, April 24, 2007 12:31:22 PM  
**Attachments:**

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### **ISS On-Orbit Status 04/24/07**

All ISS systems continue to function nominally, except those noted previously or below. *One more slow day for the crew.*

The crew's work/sleep cycle has now been reestablished in its regular time period. Wakeup: 2:00a. EDT midnight EDT; bedtime: 5:30pm.

Before breakfast, CDR Yurchikhin, FE-1 Kotov & FE-2 Williams performed the Russian biomedical routine assessments of PZeh-MO-7/Calf Volume Measurement and PZeh-MO-8/Body Mass Measurement (first time for Fyodor and Oleg, 8<sup>th</sup> time for Suni), using the IM mass measurement device which Kotov afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference pints, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

As is standard procedure for newly arrived station residents, the E15 crew had their daily PMCs (Private Medical Conferences). For Fyodor and Oleg, this included filling out the questionnaire for the standard Russian biomedical Braslet-M/Anketa ("bracelet/questionnaire") test procedure. *[If they so desire, Fyodor and Oleg may evaluate a number of "bracelet" cuffs for their usefulness in suppressing the adverse effects of micro-G for the "newcomer" aboard the station during the acute phase of adaptation to weightlessness, if there are such indications. The "bracelets" are compression cuffs attached to a belt and worn on the upper thighs*

*over the coveralls, intended as countermeasures against the initial micro-G effects of blood filling (vasculature) in the upper torso (heaviness and blood pulsation in the head), facial puffiness, nasal stuffiness, painful eye movement, and vestibular disorders (dizziness, nausea, vomiting). They create artificial blood accumulation in the upper thirds of the thighs, causing some of the circulating blood volume to relocate from the upper body to the lower extremities, thereby (hopefully) correcting the adverse hemodynamic effect of micro-G and thus improving the crewmember's working capability. The actual compression cuff in the Braslet units is a combination of alternating multi-layer tensile and non-tensile elements, whose distension by body movements creates elastic forces that produce the necessary pressure on the body surface.]*

Before sleep time, the FE-1 will unstow and install the equipment for the periodic Russian MO-10 "Hematokrit" testing that is scheduled tomorrow for all three crewmembers. *[MO-10 measures the hematocrit (red blood cell mass) value of the blood (it is a well-known phenomenon of space flight that red blood cell mass {normal range: 30-45%} tends to go down over time).]*

After transferring to the Soyuz TMA-10/14S, Kotov assembled and installed the IMV (intermodular ventilation) air duct into the spacecraft's Orbital Module and connected its BVN fan & air heater assembly with a jumper at the RBS-20 power outlet to the SM BKS (Service Module Onboard Cable Network).

FE-2 Williams conducted the scheduled monthly inspection of the RED (Resistive Exercise Device) with canister cords and accessory straps as well as the canister bolts for re-tightening if required.

Later, Sunita also performed the weekly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), checking the condition of the roller bearings and record its time & date values.

Fyodor Yurchikhin completed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the Service Module (SM), including the ASU toilet facilities systems/replaceables.

The crew worked out with the regular 2.5-hr. physical exercise protocol (about half of which is used for setup & post-exercise personal hygiene) on TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1).

Afterwards, Sunita will transfer the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the

HRM storage medium (done six times a week).

At ~7:20am EDT, the two Russian crewmembers downlinked PAO TV greetings to the winners of the fifth annual award presentation of the Academy of Outstanding Athletic Achievements Slava ("Glory"), based on the performance results of Russian athletes in 2006. *[On the taped video message, to be presented at the event on Thursday, 4/26, at the Russian Army Central Academic Theater, Fyodor Yurchikhin briefly addresses the winners and audience, then opens the envelope with the winners in the "The Best Men's Team" category.]*

At ~10:00am, the crew held the first of their weekly teleconferences with the JSC Astronaut Office (Steven Lindsey) via S-band S/G (space-to-ground).

At 6:23am EDT tomorrow morning, the ISS will perform a brief reboost burn using the SM thrusters for an expected delta-V of ~1.0 m/s. The purpose is to test the SM thrusters and set up proper phasing (orbital position) conditions for Progress 25P and STS-117/13A.

For Sunita's next voluntary "Saturday Science" program, payload planners are proposing another session with CFE (Capillary Flow Experiment), this time doing the ICF2 (Interior Corner Flow 2) experiment. *[If the FE-2 agrees, she would do it on Sunday since Saturday is already preplanned with other crew activities.]*

Today's CEO (Crew Earth Observation) photo targets were **Somalia Coast, Africa** (*weather was predicted to be mostly clear over the Horn of Africa coast. ISS orbit track ran parallel the coastline, providing an opportunity for an overlapping mapping series of frames of the coastal area [to the left of track]. This region is predicted to undergo rapid ecosystem change due to development over the next decade, and baseline imagery of the current vegetation and land-cover patterns will be useful for later comparison*), and **Pinacates Biosphere Site, New Mexico** (*ISS had a nadir pass over the Pinacates volcanic field, and this was a good opportunity to capture a spring seasonal image set of the area. The region has been designated as an international biosphere preserve due to the unique flora, fauna, and geological attributes of the region*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 4:24am EDT [= epoch]*):

Mean altitude -- 332.8 km  
Apogee height -- 343.4 km  
Perigee height -- 322.2 km  
Period -- 91.19 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0015764  
Solar Beta Angle -- 5.0 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in last 24 hours -- 120 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48211

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/25/07 -- Reboost burn 1 (SM Main Engine Test)  
04/28/07 -- Reboost burn 2 (phasing)  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/08/07 -- NET ("Not earlier than"), STS-117/Atlantis/13A launch (S3/S4 trusses)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/09/07 -- (NET) STS-118/Endeavour/13A.1 launch -- S/Hab-SM, S5, ESP3  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/20/07 -- NET, STS-120/Discovery/10A launch -- Node 2, racks  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
12/06/07 -- NET date for STS-122/Atlantis launch -- Columbus Module, ICC-Lite  
01/29/08 -- Progress M-63/28P launch  
02/14/08 -- NET, STS-123/Endeavour launch -- SLP-SPDM, JEM ELM-PS  
04/24/08 -- NET, STS-124/Discovery launch -- JEM PM "Kibo", racks, RMS.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/23/07  
**Date:** Monday, April 23, 2007 3:13:28 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

### **ISS On-Orbit Status 04/23/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 1 of Increment 15.*

The crew's work/sleep cycle is slipping back to its nominal time period. Wakeup this morning: 12:00 midnight EDT; bedtime today: 5:30pm (to regular 2:00am tomorrow morning).

CDR Yurchikhin performed his first servicing of the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), resetting (cleaning) PCMCIA memory card #924 in laptop RSK1, replacing the AST spectrometer's memory card #925 with it and transferring the data contained on #925 for downlink to TsUP/Moscow via OCA after ascertaining its file size. The CDR also conducted a health check of the AST spectrometer (on panel *[ALTCRISS uses the AST spectrometer employed by VC8 guest cosmonaut Roberto Vittori in 2005 in the DC1 for the Italian LAZIO (Low Altitude Zone/Ionization Observatory) experiment.]*)

For today's voluntary "Saturday Science" program, Sunita set up the CFE (Capillary Flow Experiment) equipment in the Lab MWA (Maintenance Work Area) and performed one of the experiments. Afterwards, she tore down and stowed the hardware. *[CFE makes use of the station's micro-G environment to investigate the special dynamics of capillary flow, i.e., the interaction of liquid with solid that can draw a fluid up a narrow tube and can be exploited to control fluid orientation so that fluid systems on spacecraft perform predictably. Sunita performed the "Vane Gap 2" portion of the CFE suite, a study of capillary flow when there is a gap between interior corners of fluid containers, such as in the gap formed by an interior vane and tank wall of a large propellant storage tank, or the near intersection of vanes in a tank with a complex vane network. Main difference between VG-1 and VG-2 is that the latter has a thicker vane (5 mm) than the former (2 mm), with fluid volume*

*in the vessel adjusted accordingly. The results of CFE will have applications to management of liquid fuels, cryogenics, water-based solutions, and thermal fluids in spacecraft systems. The last CFE session was conducted by Sunita Williams on 4/7. Today's is the tenth run aboard ISS.]*

With SAMS (Space Acceleration Measuring System) deactivated after having done its job during the Soyuz 13S departure, FE-2 Williams disconnected ER1 (Express Rack 1) from the Lab ITCS (Internal Thermal Control System) jumper at the LAO2 RIP (Rack Interface Panel).

Yurchikhin reconfigured the Russian telephone/telegraph subsystem (STTS) from its primary string, used for the Soyuz TMA-9 departure, back to nominal mode on the backup string. *[The "Voskhod-M" STTS enables telephone communications between the SM, FGB, DC1 Docking Compartment and U.S. segment (USOS), and also with users on the ground over VHF channels selected by an operator at an SM comm panel, via STTS antennas on the SM's outside. There are six comm panels in the SM with pushbuttons for accessing any of three audio channels, plus an intercom channel. Other modes of the STTS include telegraphy (teletype), EVA voice, emergency alarms, Packet/Email, and TORU docking support.]*

After swapping the A31p laptop shells of SSC5 (Station Support Computer 5, #1024) and SSC6 (#1031) for the next session of EarthKAM (Earth Knowledge Acquired by Middle School Students), Sunita unstowed, set up and activated the equipment for the EarthKAM program for a new session (the 26<sup>th</sup> time aboard the ISS and the first time on Increment 15). *[EK is using a DCS 760 electronic still camera with 50mm (f/1.4) lens, powered by 16Vdc from a 28 Vdc adapter, taking pictures by remote operation from the ground, without crew interaction. The student requests are uplinked in a camera control file to an A31p SSC (Station Support Computer) laptop which then activates the camera at specified times and receives the digital images from the camera's storage card on its hard drive, for subsequent downlink via OPS LAN.]*

FE-1 Kotov performed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the Service Module (SM), including the ASU toilet facilities systems/replaceables.

Later today, the FE-2 will power down the IWIS (Internal Wireless Instrumentation System) in Lab, Node, FGB and SM, leaving the cables in place to support the upcoming SM reboost activity.

The crew worked out with the regular 2.5-hr. physical exercise protocol (about half of which is used for setup & post-exercise personal hygiene) on CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (FE-

2) and VELO bike with bungee cord load trainer (CDR, FE-1).

Afterwards, Suni copied the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~10:45am, Williams set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 10:50am conducted a ham session with Scuola Europea Varese in Varese, Italy (about 50 km NW from Milan).

A second ham session by Suni followed at 2:45pm with Kingston Elementary School at Virginia Beach, VA.

At ~11:15am, the crew also held a crew-discretionary televised teleconference with Northmont High School via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC8 laptop).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 4:24am EDT [= epoch]*):

Mean altitude -- 332.8 km

Apogee height -- 343.4 km

Perigee height -- 322.2 km

Period -- 91.19 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0015764

Solar Beta Angle -- 5.0 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 120 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48211

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/25/07 -- Reboost burn 1 (SM Main Engine Test)

04/28/07 -- Reboost burn 2 (phasing)

05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET) launch date for STS-117/Atlantis/13A launch (S3/S4 trusses)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/09/07 -- NET launch date for STS-118/Endeavour/13A.1 -- S/Hab-SM, S5, ESP3  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/20/07 -- NET launch date for STS-120/Discovery/10A -- Node 2 launch  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
12/06/07 -- NET launch date for STS-122/Atlantis  
01/29/08 -- Progress M-63/28P launch  
02/14/08 -- NET launch date for STS-123/Endeavour  
04/24/08 -- NET launch date for STS-124/Discovery. -

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/22/07  
**Date:** Sunday, April 22, 2007 1:44:09 PM  
**Attachments:** [image002.gif](#)

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### **ISS On-Orbit Status 04/22/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 15 (CDR Fyodor Yurchikhin, FE-1 Oleg Kotov, FE-2 Sunita Williams). Ahead: Week 1 of Increment 15 (Increment 14 lasted 30 weeks).*

Yesterday's On-Orbit Status report already "pre-viewed" today's crew activities due to their night-turned-into-day work schedule (now gradually returning to more nominal times). Wakeup last night: 8:00pm EDT; bedtime today: 3:00pm (to 12:00 midnight tomorrow morning).

After wakeup, the crew conducted the regular weekly 3-hr task of thorough station cleaning. [*"Uborka", done routinely on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning*

*solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

Afterwards, FE-2 Williams disconnected the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable at the Lab RWS (Robotics Work Station) which supported downlinking the camcorder views of the parting 13S crewmembers from the Service Module (SM) rear compartment through U.S. Ku-band assets.

Sunita also worked on the ALTEA (Anomalous Long Term Effects on Astronauts) hardware, recovering the experiment's DAU (Data Acquisition Unit) with the usual ALTEA CPU (Central Processing Unit) lockup procedure and readying the video equipment.

The crewmembers held their weekly PFCs (Private Family Conferences) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC8 laptop), Oleg at 7:00am, Fyodor at 8:40am and Suni at 11:50am.

The Inc-15 crew also worked out with the regular 2.5-hr. physical exercise protocol (about half of which is used for setup & post-exercise personal hygiene) on TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1).

Afterwards, Suni copied the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Oleg Kotov performed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

At ~11:30am, Yurchikhin set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 11:35am conducted a ham session with high school & college students and teachers assembled for the Tenth Readings Contest dedicated to the anniversary of S.A. Kaplan in Nizhniy Novgorod, 4/20-4/23. *[The conference is dedicated to the 100<sup>th</sup> birthday of S.P. Korolev, 150<sup>th</sup> birthday of K.E. Tsiolkovsky and 50<sup>th</sup> Anniversary of the launch of the first Earth satellite.]*

For her next voluntary "Saturday Science" program, Sunita Williams has selected the CFE VG2 (Capillary Flow Experiment Vane Gap 2) experiment, to be conducted tomorrow, also a free day for her.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/25/07 -- Reboost burn 1

04/28/07 -- Reboost burn 2 (phasing)

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET) launch date for STS-117/Atlantis/13A launch (S3/S4 trusses)

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/09/07 -- NET launch date for STS-118/Endeavour/13A.1 -- S/Hab-SM, S5, ESP3

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch

08/18/07 -- Progress M-61/26P docking (DC1)

08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15 launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing

10/20/07 -- NET launch date for STS-120/Discovery/10A -- Node 2 launch

Late Oct/early Nov -- US EVA-10,-11,-12

11/??/07 -- Progress M-62/27P launch

12/06/07 -- NET launch date for STS-122/Atlantis

01/29/08 -- Progress M-63/28P launch

02/14/08 -- NET launch date for STS-123/Endeavour

04/24/08 -- NET launch date for STS-124/Discovery.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/21/07  
**Date:** Saturday, April 21, 2007 1:40:07 PM  
**Attachments:**

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### **ISS On-Orbit Status 04/21/07**

All ISS systems continue to function nominally, except those noted previously or below. *Increment 15 is underway: First day alone for CDR Fyodor Yurchikhin, FE-1 Oleg Kotov and FE-2 Sunita Williams. Day 132 in space for Suni (launched 12/10/06 on STS-116).*

***Yest posadka!*** *(We have Landing!)* Welcome back home, Misha, L-A and Charles! *[Real-time video coverage of the landing was provided to the ISS crew via Ku-band and MS-NetMeeting application on the SSC-8 (Station Support Computer 8) laptop. Exclamation Suni: "Fantastic!"]*

Soyuz TMA-9/13S, carrying two-thirds of the Expedition 14 crew plus SFP Simonyi as part of its 6680 kg undock mass, **landed successfully** on time this morning at 8:31a EDT in the steppes of Kazakhstan, with the crew in excellent condition. *[Undocking from the ISS SM aft port was at 5:10am, deorbit burn from 7:42am-7:46am. Mission length for Tyurin and Lopez-Alegria: 215d 8h 22m; for Charles Simonyi: a record 13.5d. The landing took place at the secondary landing site, ~135 km from Dzhezkazgan at 48.32° LAT, 69.10° LONG. The SA capsule landed on its side and had to be rolled by husky men to the proper hatch-opening position (internal hatch folding down). As expected, Expedition 14 flew a tremendous mission and established several records. L-A completed five spacewalks (adding to his five previous EVAs, a U.S. record for not only number of EVAs but also for cumulative EMU time: 57h 40m). He also became the U.S. space flyer with the longest single spaceflight: more than 215 days, topping the 196-day mark set by Dan Bursch and Carl Walz in 2001 & 2002. Suni Williams too tumbled cosmic records: for number of spacewalks and total EVA time spent by a woman: 4 excursions for a total of 29h 17 min.]*

The ISS crew, currently asleep, will have a light-duty day, with wake-up tonight at 8:00pm EDT & bedtime tomorrow (Sunday) at 3:00pm (to 12:00am Monday).

It being Saturday, the crew will conduct the regular weekly 3-hr task of thorough station cleaning after wakeup. *["Uborka", done routinely on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

Afterwards, FE-2 Williams disconnects the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable at the Lab RWS (Robotics Work Station) which supported downlinking the camcorder views of the parting crewmembers from the Service Module (SM) rear compartment through U.S. Ku-band assets.

Later, Sunita is to work on the ALTEA (Anomalous Long Term Effects on Astronauts) hardware, restarting the experiment's DAU (Data Acquisition Unit) with the usual ALTEA CPU (Central Processing Unit) lockup procedure and readying the video equipment. *[Purpose of ALTEA is to define and measure descriptors for the electrophysiological brain functioning and to follow their dynamics, correlating it with space environments. This involves CNSM measuring sessions by crewmembers wearing a brain electrode helmet for taking a 32-channel EEG (electroencephalograph), plus long-term unmanned real-time particle flux dosimetry (DOSI mode) inside the ISS. A specific focus of CNSM is on abnormal visual perceptions (such as the often reported phosphenes, - "light flashes") and the impact of particles on brain functions in micro-G. ALTEA also uses six particle detectors (originally introduced on Mir), the EEG helmet, a visual stimulator and a pushbutton. These devices can be used separately or in any combination, permitting several different experiments: in physics, dosimetry, psychophysics, electrophysiology and cognitive neurophysiology.]*

Tomorrow morning, the crewmembers are all scheduled for their weekly PFCs (Private Family Conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on the SSC8 laptop), Oleg at 7:00am, Fyodor at 8:40am and Suni at 11:50am.

Also after wakeup the Inc-15 crew will work out with the regular 2.5-hr. physical exercise protocol (about half of which is used for setup & post-exercise personal hygiene) on TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1).

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For her next voluntary "Saturday Science" program, Sunita Williams has selected the CFE VG2 (Capillary Flow Experiment Vane Gap 2) experiment, to be conducted on Monday (4/23), her free day.

### **Weekly Science Update** (*Expedition Fourteen -- 30<sup>th</sup>*)

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* "Thank you for your dedication in completing the last session of the ALTEA/CNSM experiment! It has been great working with you!"

*CFE (Capillary Flow Experiment):* "Thank you for selecting CFE for Weekend Science this Monday! We are grateful for the opportunity to gain more science."

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* "Thank you for participation with CGBA this week! We continue to receive great video of both habitats."

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* Planned.

*EPO (Educational Payload Operation):* "Thank you for performing EPO/IPY - It was an excellent demonstration!"

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*CEO (Crew Earth Observations):* Through 4/17 the ground has received a total of 7,297 ISS/CEO images for review and cataloging. Over 95% of these have now been cataloged. About 26% were acquired at the requested target times. "Thank

you for your diligence. Your extraordinary view of Venice, Italy (acquired in March) will be published on NASA/GSFC's Earth Observatory website this weekend. The detail of your image highlights the specialized land use and development of the islands of the Laguna Veneta.

No CEO (Crew Earth Observation) photo targets uplinked for today.

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 5:19am EDT [= epoch]*):

Mean altitude -- 333.1 km

Apogee height -- 343.8 km

Perigee height -- 322.3 km

Period -- 91.19 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0015973

Solar Beta Angle -- 14.1 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 120 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48180

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/25/07 -- Reboost burn 1

04/28/07 -- Reboost burn 2 (phasing)

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" (NET) launch date for STS-117/Atlantis/13A launch (S3/S4 trusses)

07/13/07 -- FGB solar array retraction

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07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/09/07 -- NET launch date for STS-118/Endeavour/13A.1 -- S/Hab-SM, S5, ESP3

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10/01/07 -- Progress M-61/26P undocking (DC1)  
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10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/20/07 -- NET launch date for STS-120/Discovery/10A -- Node 2 launch  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
12/06/07 -- NET launch date for STS-122/Atlantis  
01/29/08 -- Progress M-63/28P launch  
02/14/08 -- NET launch date for STS-123/Endeavour  
04/24/08 -- NET launch date for STS-124/Discovery.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/20/07  
**Date:** Friday, April 20, 2007 2:05:25 PM  
**Attachments:**

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**ISS On-Orbit Status 04/20/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 12 (last day) of joint E14/E15 operations by CDR-14 Miguel Lopez-Alegria, FE-1-14 Mikhail Tyurin, FE-2 Sunita Williams, CDR-15 Fyodor Yurchikhin, FE-1-15 Oleg Kotov and SFP/VC12 Charles Simonyi. Day 215 in space for L-A & Misha.*

Aboard ISS, the E14/E15 crew will be completing final steps for tomorrow morning's undocking of Soyuz 13S, scheduled for 5:11am EDT. The crewmembers are currently in an extended sleep period: Wakeup is set for this afternoon at 4:45pm EDT; sleep time begins tomorrow morning at 8:45am.

Yurchikhin will perform the daily checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatchways, including the SM-to-Soyuz tunnel, and the FGB-to-Node passageway. *[This is important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

Kotov will be in charge of final loading & stowing return equipment in the severely volume-limited Soyuz capsule, including dismantling remaining return payloads and transferring them to the TMA-9 Descent Module (SA). *[Payload gear to be packed up and transferred to 13S consists of the SAMPLE kit including Simonyi's LBP/MUSCLE record sheets, BTKh-14 BIOEMULSIYA, Ice Pack & Bioreactor in their BOKONT-K container, BIO-8 PLAZMIDA and BTKh-10 KONJUGATSIYA from the CRYOGEM-03M refrigerator, BIO-12 REGENERATION's two PLANARIA containers, and the GCF-JAXA CRYSTALLIZER hardware from the TBU-04 (Universal Bioengineering Thermostat 04).]*

Later, Oleg will power down the thermostat-controlled CRYOGEM-03M, CRYOGEM-03, TBU and KUBIK 1&2 coolers.

With Soyuz TMA-9 no longer available as emergency CRV (crew return vehicle) for the coming Increment, Kotov is to verify correct transfer of its three Emergency Procedures ODF (DAS EhP) books to the new CRV, TMA-10, docked at the FGB nadir port. *[After 13S departure, the Service Module (SM) aft port is free to receive the next Progress vehicle, 25P, on 5/14.]*

The traditional crew farewell ceremony is scheduled for 11:10pm tonight, to be downlinked via Ku-band television. Let's tune in!

Then, Suni will hook up the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable at the RWS (Robotics Work Station) and set up camcorders for the subsequent video coverage of the crew departure from the RS.

At ~12:35am, Kotov and Yurchikhin are scheduled to configure the onboard communications system (STTS) for the undocking, both working to set up, check and maintain the VHF comm link from the TMA-9 SA to TsUP/Moscow via RGS (Russian Ground Site) and the comm system for Soyuz undocking and descent.

Afterwards, at ~12:40am, CDR Lopez-Alegria and FE-1-14 Mikhail Tyurin will be activating the spacecraft and also testing the S-band comm links from Soyuz. *[The STTS comm system will be reset by Kotov to nominal configuration a few minutes after 13S departure (~5:15am).]*

FE-2 Sunita Williams will verify proper closure of the Lab science window shutter for protection from thruster plumes during undocking, while Oleg powers down the ham radio equipment in SM and FGB at ~1:00am to prevent RF interference with the departing spacecraft.

After the televised Soyuz ingress by the returning E14+SFP crew, Mike L-A and Misha Tyurin will remove the BZV QD (quick disconnect) clamps (~1:40am) and close transfer hatches between 13S & SM aft port (~2:00am), followed by the standard one-hour hatch hermeticity check (Daily Orbit 13). *[Russian thrusters will be disabled during the 1h 40m period from start of BZV removal to leak check completion. Afterwards, at 3:25am, ISS attitude control authority is handed over to Russian MCS (Motion Control System) with thrusters enabled, until 8:30am when it will be returned to U.S. CMG momentum management. For the actual undocking at 5:11am, the station will briefly (9 min.) float in free drift.]*

Kotov is scheduled for the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Oleg will also power down the gas analyzer (GA) in the “fresh” Soyuz, TMA-10/14S, docked at the FGB nadir port.

Working on the IMS (Inventory Management System), the new ISS CDR, Fyodor Yurchikhin, is to update/edit its standard “delta file” on the Russian VKS (Auxiliary Computer System), including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

On Sunita’s timeline for today is another periodic (weekly) atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit).

Batteries are to be replaced if necessary. *[CSA-CP measurements are to be gathered with the 12A.1-delivered units #1044 (prime) & #1051 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1007 for CO<sub>2</sub> in SM (panel 449) and Lab, along with battery ticks. The instruments will be turned off afterwards, except for #1044, and returned to their regular locations.]*

The FE-2 will do the regular bi-weekly maintenance reboot of the SSC (Station Support Computer) File Server and OCA Comm Router laptops.

Sunita’s schedule today also calls for her to complete the regular FFQ (Food Frequency Questionnaire), her 17<sup>th</sup>, on the MEC (Medical Equipment Computer). Via these FFQs, astronauts keep a personalized log of their nutritional intake over time on special MEC software. *[Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Before 13S departure, Williams will activate the SAMS ICU (Space Accelerations Measurement Unit Interface Control Unit) in its Lab rack (LAB1P2) for taking structural dynamics (vibrational) data during undocking.

Afterwards, with 13S gone, FE-2 disconnects the bypass jumper from the LAB1D6 rack to the ITCS LTL (Internal Thermal Control System/Low Temperature Loop) since the U.S. CDRA (Carbon Dioxide Removal Assembly) will later be deactivated by ground commanding, thus no longer requiring active cooling.

While Sunita is scheduled for her full physical exercise protocol on the CEVIS cycle ergometer and RED resistive exerciser, the new E15 crewmembers are to work out with their “beginner’s” program on the CEVIS (Fyodor, 1 hr), and RED (Oleg, 1 hr).

Afterwards, Suni transfers the exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts, followed by their erasure on the HRM storage medium (done six times a week).

If everything is nominal, the return to Earth of the TMA-9/13S spacecraft with Lopez-Alegria, Tyurin and Simonyi will proceed along the following approximate event sequence (all times EDT):

- ISS attitude handover to RS --- 3:25am;
- ISS in free drift --- 5:07-5:16am;
- Hooks Open command --- 5:08am; automatic undocking from SM on DO15;
- Separation springs action (delta-V ~0.12 m/sec) --- 5:11pm; (retrograde to ISS flight)
- Manual separation burn (15 sec, ~0.65 m/sec) --- 5:14am;
- Rbar Crossing (overtaking ISS ~1000 m below it) --- 5:35am;
- Deorbit Burn start (delta-V 115.2 m/sec) --- 7:42:30am;
- Deorbit Burn complete --- 7:46:48am
- Tri-Module separation (140.1 km) --- 8:05:37am;
- Atmospheric entry (101.8 km, with ~170 m/sec) --- 8:08:29am;
- Max G-load --- 8:14am;
- Parachute deploy command --- 8:16:33am;
- ISS attitude control handed back to US --- 8:30am;
- 13S Landing (at secondary landing site in Jezkazgan region) --- 8:30:34am EDT; 6:30:34pm local Kazakhstan time;
- Local Sunset --- 10:23am (8:23pm local).

*[Note: Kazakhstan time is GMT+6h; EDT+10h.]*

### **On the ISS, TMA-9/13S departure marks the official begin of Increment 15.**

During the undocking, structural dynamics data are taken by IWIS (Internal Wireless Instrumentation System), SAMS (Space Acceleration Measurement System) and the external S0 truss-mounted SDMS (Structural Dynamics Measurement System). *[IWIS will record data for approximately 1 hour on RSUs (Remote Sensor Units) in the Node and Lab. The SDMS is ground controlled and can store only about 10 minutes of data before starting to overwrite its buffer; thus, SDMS will take data only from 2 minutes prior to 2 minutes after the undocking.]*

After the undocking, CDR Yurchikin will manually close the PEV (Pressure Equalization Valve) between the SM and docking port vestibule, and the onboard video configuration in the Lab will be restored by FE-2 Williams by disconnecting the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable from the Lab Robotics Work Station (RWS).

Crew sleep aboard the station begins at 8:45am (Saturday), after they have been notified of the successful landing.

Sleep/work cycle will later shift back gradually to more “regular” hours, with Saturday wakeup at 8:00pm, bedtime at 3pm (Sunday), followed by bedtime at 12am (Monday). Sunday and Monday will both be crew rest days.

Today's CEO (Crew Earth Observation) photo targets were **Wells Creek Impact Crater** (*weather has cleared over western Tennessee, providing an opportunity to photograph this impact crater. ISS had have a nadir pass over the target; overlapping mapping frames along-track as ISS approached and left the target area were recommended as the impact feature is a subtle one on the landscape*), and **Kingman Reef, Hawaiian Island chain** (*ISS had a near-nadir pass over this coral reef target. High resolution photographs of the reef will enable comparison with previous imagery to track coral extent and changes in coloration [as indicators of reef ecosystem health]. Looking slightly to the left of track for the reef*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 5:00am EDT [= epoch]*):

Mean altitude -- 333.2 km

Apogee height -- 343.9 km

Perigee height -- 322.5 km

Period -- 91.20 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0015933

Solar Beta Angle -- 18.7 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 120 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48164

### **What will the Soyuz TMA-9/13S crew experience during their reentry/descent?**

For the reentry tonight, Tyurin, Lopez-Alegria and Simonyi will wear the Russian Kentavr anti-G suit. *[The Kentavr garment is a protective anti-g suit ensemble to facilitate the return of a long-duration crewmember into the Earth gravity.*

*Consisting of shorts, gaiters, underpants, jersey and socks, it acts as*

*countermeasure for circulatory disturbance, prevents crewmember from overloading during descent and increases orthostatic tolerance during post-flight adaptation. Russian crewmembers are also advised to ingest fluid-electrolyte additives, viz., three sodium chloride tablets during breakfast and after the midday meal, each time with 300 ml of fluid, and two pills during the meal aboard Soyuz before deorbit.]*

Before descent:

Special attention will be paid to the need for careful donning of the medical belt with sensors and securing tight contact between sensors and body.

During preparation for descent, before atmosphere reentry, crewmembers settle down comfortably in the Kazbek couches, fasten the belts, securing tight contact between body and the seat liner in the couch.

During de-orbit:

Dust particles starting to sink in the Descent Module (SA) cabin is the first indication of atmosphere reentry and beginning of G-load effect. From that time on, special attention is required as the loads increase rapidly.

Under G-load effect during atmosphere reentry the crew expects the following experience:

*Sensation of G-load pressure on the body, burden in the body, labored breathing and speech. These are normal sensations, and the advice is to "take them coolly". In case of the feeling of a lump in the throat, this is no cause to "be nervous". This is frequent and should not be fought. Best is to "try not to swallow and talk at this moment". Crew should check vision and, if any disturbances occur, create additional tension of abdominal pressure and leg muscles (strain abdomen by pulling in), in addition to the Kentavr anti-G suit.*

During deployment of pilot (0.62 & 4.5 square meters), drogue (16 sq.m.) and main (518 sq.m.) parachutes the impact accelerations will be perceived as a "strong snatch". No reason to become concerned about this but one should be prepared that during the parachutes deployment and change ("rehook") of prime parachute to symmetrical suspension, swinging and spinning motion of the SA occurs, which involves vestibular (middle ear) irritations.

It is important to tighten restrain system to fasten pelvis and pectoral arch. Vestibular irritation can occur in the form of different referred sensations such as vertigo, hyperhidrosis, postural illusions, general discomfort and nausea. To prevent vestibular irritation the crew should "limit head movement and eyes movement", as well as fix their sight on motionless objects.

Just before the landing (softened by six small rocket engines behind the heat shield):

Crew will be prepared for the vehicle impact with the ground, with their bodies fixed along the surface of the seat liner in advance. "Special attention should be paid to arm fixation to avoid the elbow and hand squat" (instruction). Landing speed: ~9.9 m/sec.

After landing:

Crew should not get up quickly from their seats to leave the SA. They were advised to stay in the couch for several minutes and only then stand up. In doing that, they should limit head and eyes movement and avoid excessive motions, proceeding slowly. They and their body should not take up earth gravity in the upright position too quickly.

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/21/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 5:11am) & land (8:30am)  
04/25/07 -- Reboost burn 1  
04/28/07 -- Reboost burn 2 (phasing)  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET) launch date for STS-117/Atlantis/13A launch (S3/S4 trusses)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/09/07 -- NET launch date for STS-118/Endeavour/13A.1 -- S/Hab-SM, S5, ESP3  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/20/07 -- NET launch date for STS-120/Discovery/10A -- Node 2 launch  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
12/06/07 -- NET launch date for STS-122/Atlantis  
01/29/08 -- Progress M-63/28P launch  
02/14/08 -- NET launch date for STS-123/Endeavour  
04/24/08 -- NET launch date for STS-124/Discovery.



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/19/07  
**Date:** Thursday, April 19, 2007 4:57:41 PM  
**Attachments:** [image001.gif](#)

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### **ISS On-Orbit Status 04/19/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 11 of joint E14/E15 operations by CDR-14 Miguel Lopez-Alegria, FE-1-14 Mikhail Tyurin, FE-2 Sunita Williams, CDR-15 Fyodor Yurchikhin, FE-1-15 Oleg Kotov, SFP/VC12 Charles Simonyi. Day 214 in space for L-A & Misha.*

Aboard ISS, the E14/E15 crew rotation/handover period continues with full activity schedules for all involved. Crew wakeup was at 2:00pm EDT; sleep time begins tomorrow morning at 5:30am.

Right after wake-up, Mike Lopez-Alegria worked on the HRF-1 (Human Research Facility 1) & HRF-2 computer accessories kits for an equipment swap. *[Activities include moving specific cables from the IBM 760XD accessories kit to the A31p kit, replacing HRF1 & 2 drawer liners in the K-Drawer, and stowing the accessories kits. Formerly listed on the discretionary "job jar" task list, these activities are now hard-scheduled on the timeline.]*

With the vacuum cleaner restored to service, Williams is performing the USOS (US segment) hatch seal inspection (Node forward, aft & starboard, Lab aft, Airlock IV hatch) in support of ACS (Atmospheric Control System) maintenance (last time done: 1/22/07). Originally scheduled for 4/11, the job had been moved to the task list because of vacuum cleaner unavailability and is now hard scheduled again.

Sunita will also remove the failed SCU-2 (Synchronization & Control Unit 2) of the video subsystem in the Avionics #1 Rack (LAB1D5) as a get-ahead for Mission 13A, to be returned on 13A. *[A replacement SCU will be delivered on 13A and installed during the docked period.]*

Closing out the VC12 experiment suite, FE-1 Mikhail Tyurin transferred the kit of the BIO-11 STATOKONIA payload, with the ULITKA ("snail") incubator, to the TMA-9

Descent Module (SA) for Earth return. This activity was reported for yesterday but actually moved to today in a late timeline change. *[BIO-11 studies the composition of stotoconia, i.e., the organ of equilibrium in snails, and other phenomena exhibited by "ulitka" in zero-G and post-flight.]*

Tyurin, CDR-15 Yurchikhin and FE-1-15 Kotov have more than 6 hrs between them on today's timeline for hardware prepacking and transfer to Soyuz for Earth return in the SA or disposal in the BO (Habitation Module).

Sunita is to set up the IWIS (Internal Wireless Instrumentation System) for measuring structural dynamics during the Soyuz undocking on 4/21 (Saturday). *[Her attempts last night to perform the delayed memory dump from the balky SM RSU (Service Module Remote Sensing Unit) after moving the latter to the Lab and swapping it with the Lab RSU were successful. All data of the recent 13S relocation are now on the ground for analysis.]*

Oleg Kotov is scheduled for the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), CDR-15 Yurchikhin will update/edit its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Fyodor and Oleg have more time allocated on their schedule today for ISS familiarization & adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

The E-14 crew will work out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR-14/70 min.), TVIS treadmill (CDR-14/20 min, FE-1-14, FE-2) and RED resistive exercise device (CDR-14/60 min, FE-2). CDR-15 Yurchikhin and FE-1-15 Kotov will also perform an hour of exercise, both on the RED.

Afterwards, Suni copies the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

VC12 Charles Simonyi is to make the ninth of his scheduled daily entries in the log/

questionnaire for the LBP (Low Back Pain) "Muscle" experiment on his Russian laptop. *[As Greg Olsen and Anousheh Ansari did before him, Simonyi is studying the lower back pain which astronauts often experience in the weightless conditions of space, in spite of the fact that the spinal vertebrae are not compressed in micro-G as in gravity (thereby causing back pain). It is hypothesized that lower back pain may indeed develop without compression of the vertebrae from the deep muscle "corset" that is required to keep the lower part of the vertebrae, the sacral bone, in position between the two hipbones. The tonic postural muscles of this corset get "activated" when getting up in the morning and "deactivated" when resting, a protective mechanism which may not work in space where the muscles are known to atrophy over time. This would lead to strain in certain ligaments and consequently pain in the lower back. LBP aims at testing this hypothesis and assessing the level of muscle atrophy in response to micro-G.]*

Working with Oleg, the SFP performs another culture sampling for his VC12 experiment SAMPLE, which looks for bacteria onboard the station. *[Possible contamination by pathogenic organisms is a serious problem on space missions. In weightlessness, some bacteria grow faster than under conditions on Earth, and they are much more antibiotic resistant. However, it is not known whether and to which extent this different behavior of bacteria could affect the health of the crew or damage technical equipment on board. The SFP's SAMPLE experiment, which investigates what kind of microbial species are to be found on the ISS and how these adapt to space environment conditions, consists of Simonyi taking samples from himself and from certain areas of the station by rubbing swab sticks over surfaces susceptible to having bacteria, for example switches, keyboards and personal hygiene equipment. ]*

Kotov will also obtain SAMPLE experiment specimen from himself, to be placed in the KRIOGEM-03M refrigerator. *[This activity was reported for yesterday but actually moved to today in a late timeline change.]*

After Simonyi terminated his seventh and last session of his VC12 experiment PILLE-MKS yesterday, Kotov today will remove the nine sensors and redeploy them in the RS (Russian segment) at their old places. This activity was reported for yesterday but actually moved to today in a late timeline change. *[With PILLE, the SFP has been recording sensor measurements from nine radiation sensors near his work place, then copying their readings on a daily basis to his PC memory card.]*

Along with his regular daily tagup with his ground support crew in Moscow via channel VHF1 and the daily personal IP (Internet Protocol phone call, Simonyi will continue his activity work on a laptop for email ops.

Also scheduled on Simonyi's timeline again are the standard Earth photo/video

opportunities, as always assisted by Yurchikhin.

Crew activities performed yesterday/overnight but not reported yet due to late timeline change were as follows:

- Sunita worked on the Airlock EPS (Electrical Power System), activating its UOP (Utility Outlet Panel).
- After their session on the Robotics Onboard Trainer (ROBoT) in the Node on 4/17, Williams and Kotov discussed ROBoT in a teleconference with the ground at 4:30pm EDT, followed by a conference by Suni and L-A with payload specialists. *[ROBoT uses DOUG (Dynamic Operations Ubiquitous Graphics) software, two hand controllers (RHC/Rotational Hand Controller & THC/Translational HC) and two laptops (one for graphics, one for the simulation) for on-orbit training of MSS (Mobile Service System) and SSRMS operations.]*
- CWC (Contingency Water Container) #1067, filled with 16L of expired potable water, was successfully processed for drinking water. Afterwards, Oleg Kotov prepared a U.S. hose for technical water transfers by starting a process of filling and disinfecting it between a Russian EDV container and a U.S. CWC (Contingency Water Container), a periodic task to assure cleanliness of the hoses used for transferring technical water to the SRV-K condensate water processor. *[To start the process, the disinfectant was pumped manually from the EDV into the hose, to be left there for 24 hours.]*
- Tyurin and Yurchikhin continued an audit of the SVO Water Supply System begun on 4/2 by the E14 crew, based on an uplinked IMS (Inventory Management System) listing. The activity also included a search for an electric condensate pumping unit (BPK) of the Russian water processing system (SRV-K2), “lost” during Increment 13.
- More searches by Misha and Oleg involved missing ESA payload items (the Platon kit of the NOA/Nitric Oxide Analyzer experiment & a PORTAPRES power cable for the CARDIOCOG experiment), and an MLI (multilayer insulation, Russian: EVTI) blanket kit.
- Mike L-A and Misha Tyurin worked on new SOKOL spacesuits, conducting leak checks and hanging them up in Soyuz TMA-9 for drying. Also replaced were SOKOL gloves.
- The two Russian flight engineers worked in the Soyuz vehicles, replacing an ODF (Orbital Data File) section in TMA-9 with a “Block 2” section from TMA-10.

Oleg Valerievich Kotov, Russia's Cosmonaut No. 100, born in Simferopol on the Crimean, was congratulated on his TMA-10 flight and ISS-15 mission in a letter from A. Gritsenko, Chairman of the Supreme Rada (Parliament) of the Autonomous Republic of Crimea.

*Atmosphere Revitalization:* In the last few days, Elektron oxygen production has regularly been supplemented with repressurizations from Progress 24P O<sub>2</sub> stores. A 6.2 mmHg O<sub>2</sub> repress yesterday exceeded the targeted value of ~5.0 mmHg. When cabin ppO<sub>2</sub> concentration approached the limit setting of 24.1% last night, the Elektron was moded down to 32 Amp. O<sub>2</sub> concentration currently is 23.4%. In addition, due to the relatively low total cabin pressure of 733.8 mmHg, ground teams are assessing using N<sub>2</sub> (nitrogen) for today's scheduled repressurization instead of O<sub>2</sub>.

Today's CEO (Crew Earth Observation) photo target is **Konza Prairie, Kansas** (*weather was predicted to be clear over the Konza Prairie LTER [Long Term Ecological Research] site. Consisting mainly of grassland prairie, this site is focused mainly on invasive species dynamics and the effects of fire and grazing on the landscape. An overlapping series of nadir, high-resolution images taken along-track will be most useful for monitoring of vegetation and soil changes in the site area.*)

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/21/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 5:11am) & land (8:30am)  
04/25/07 -- Reboost burn 1  
04/28/07 -- Reboost burn 2 (phasing)  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET) launch date for STS-117/Atlantis/13A launch (S3/S4 trusses)

07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/09/07 -- NET launch date for STS-118/Endeavour/13A.1 -- S/Hab-SM, S5, ESP3  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/20/07 -- NET launch date for STS-120/Discovery/10A -- Node 2 launch  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
12/06/07 -- NET launch date for STS-122/Atlantis  
01/29/08 -- Progress M-63/28P launch  
02/14/08 -- NET launch date for STS-123/Endeavour  
04/24/08 -- NET launch date for STS-124/Discovery.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 04/18/07  
**Date:** Wednesday, April 18, 2007 1:51:47 PM  
**Attachments:** [image001.gif](#)

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### **ISS On-Orbit Status 04/18/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 10 of joint E14/E15 operations by CDR-14 Miguel Lopez-Alegria, FE-1-14 Mikhail Tyurin, FE-2 Sunita Williams, CDR-15 Fyodor Yurchikhin, FE-1-15 Oleg Kotov, SFP/VC12 Charles Simonyi. Day 213 in space for L-A & Misha.*

Aboard ISS, the E14/E15 crew rotation/handover period continues with full activity schedules for all involved. Crew wakeup is at 2:00pm EDT; sleep time begins tomorrow morning at 5:30am.

Fyodor Yurchikhin will be performing the daily checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatchways, including the SM-to-Soyuz tunnel, and the FGB-to-Node passageway. *[This is important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

Floating in the Soyuz TMA-9/13S Orbital Module (BO), FE-1 Tyurin will dismantle and remove the LKT local temperature sensor commutator (TA251MB) of the BITS2-12 onboard telemetry system, along with its PZU-1M ROM (read-only memory) unit, now no longer required since the BO is to be jettisoned before 13S reentry. *[The electronics will be stowed on ISS for reuse in a future vehicle.]*

Yurchikhin and Tyurin are scheduled to complete the standard pre-return sanitary-epidemiological incubation status checks (MedOps SZM-MO-22), taking samples from cabin surfaces along with samples from crewmembers for sanitation and disease studies. *[The equipment, similar to yesterday's MO-21, supports determination of microbial contamination of the ISS atmosphere, specifically the total bacterial and fungal microflora counts and microflora composition according to morphologic criteria of microorganism colonies.]*

Complementing these samplings, Oleg Kotov will perform the periodic collection of

air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Mikhail Tyurin is scheduled for the second (of three) 1.5-hour "installment" of his fifth and final training session in the "Chibis" ODNT suit as standard preparation of cosmonauts for returning into gravity. Since the session will be outside an RGS (Russian ground site) comm window, with no telemetry downlink, his vital body readings will be obtained with the Tensoplus sphygmomanometer. A tagup/ calldown with ground specialists via US S-band supports the run which again will be assisted by Mike L-A. There will be one more run, tomorrow. *[The below-the-waist reduced-pressure device ODNT (US: LBNP, Lower Body Negative Pressure) in the "Chibis" garment provides gravity-simulating stress to the body's cardiovascular/ circulatory system for reestablishing the body's orthostatic tolerance (e.g., the Gauer-Henry reflex) after the six-month stay in zero-G. Tyurin's ODNT protocol today again consists of first imbibing 150-200 milliliters of water or juice, followed by a sequence of progressive regimes of reduced ("negative") pressure, set at -25, -30, -35 and -40 mmHg for five minutes each, then at -25, -30, and -40 mmHg, 10 minutes in each mode, and at -30 mmHg for 5 min, while shifting from foot to foot at 10-12 steps per minute. The body's circulatory system interprets the pressure differential between upper and lower body as a gravity-like force pulling the blood and body fluids "down".]*

In support of some troubleshooting by the ground, FE-2 Williams is scheduled to power up the SVG (Space Video Gateway) computer. *[There have been problems with recording audio as downlinked live via SVG from the PD100 camcorders, so the ground plans to uplink a video file for playback to check out the configuration.]*

Later, Mike L-A and Sunita will set up the EPO (Educational Payload Ops) camcorder and tape a demo session on the IPY (International Polar Year), explaining how the ISS plays a role in IPY efforts including unique observations by the crew. *[The demo includes descriptions of the different equipment used on the ISS and required window locations to observe the Earth. IPY, kicked off on 3/1/2007, is an international program that coordinates scientific research on the Earth's Polar Regions and lasts for two years. It is focused on understanding the roles of polar processes on global climate change, i.e.: (1) high latitudes are heat sinks of the climate system, both responding to and driving changes elsewhere on the planet; (2) polar regions are insufficiently studied because of remoteness and harsh environment; (3) new technologies, including space-based observations, and 50 years of Earth Science studies provide new base for polar studies. Thousands of scientists from around the world are participating, and NASA collaborates with*

*IPY scientists by taking pictures of their research areas during their experiments. They request these images through the CEO (Crew Earth Observations) website, and imagery will be downlinked for scientific use.]*

Oleg Kotov will conduct the periodic audit/health check of audit of all stationary lighting fixtures (SD) in the Russian segment (RS). *[The audit involved 17 lights in SM, 12 in FGB, and three in DC-1. For the health check, Oleg uses a functioning reference lamp and a reference power supply to test lighting fixtures with one or two faulty lamps and failed power supplies.]*

Sunita Williams is to undertake the monthly PEP (portable emergency provisions) safety inspection. *[The IMS-supported inspection involves verification that PFEs (portable fire extinguishers), PBAs (portable breathing apparatus), QDMAs (quick-don mask assemblies) and EHTKs (extension hose/tee kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware. In the U. S. segment (USOS), there are a total of 5 PFEs and 7 PBAs, plus 7 QDMAs and 4 EHTKs. In the Node, Suni makes sure that no more than three PBA bottles are stowed in the locker, to reduce the risk of getting too much oxygen concentration inside the stowage area in case of bottle leakage. ]*

The FE-1-15 will perform the periodic (about twice a month) replenishing of the Elektron O<sub>2</sub> generator's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

The spare BZh Liquid Unit (#056) for the Elektron is up for another internal pressure check by Oleg, to check for hermeticity. The unit was pressurized by Tyurin on 4/6 with nitrogen (N<sub>2</sub>) for the second time from the BPA Nitrogen Purge Unit (#21).

*[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

In the SM, Kotov is scheduled to conclude the two-day IFM (Inflight Maintenance) of replacing the BSR interface unit of the Russian BITS2-12B onboard telemetry measurement system to the payload TM channel. After yesterday connecting the EGE2 laptop with the RSS2 laptop, preparing the latter and deinstalling the current BSR-2, Oleg's job today is to install the BITS2-12's array matching device & interface unit (BSR-TM) in place of BSR-2 and test it with the RSS1. The activity will be supported by ground specialist tagup. *[The BSR-TM Regul interface unit is part of the Russian radio control & communications system.]*

FE-2 Williams is to perform her routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected.

Afterwards, she will cycle and reactivate the ALTEA passive dosimeters after yesterday's ALTEA CNSM (Central Nervous System Monitoring) session by Mike L-A.

Closing out the VC12 experiment suite, Misha Tyurin is to transfer the kit of the BIO-11 STATOKONIA payload, with the ULITKA ("snail") incubator, to the TMA-9 Descent Module (SA) for Earth return. *[BIO-11 studies the composition of statoconia, i.e., the organ of equilibrium in snails, and other phenomena exhibited by "ulitka" in zero-G and post-flight.]*

Tyurin, Yurchikhin and Kotov have another ~4 hrs reserved between them for more hardware prepacking for return or disposal on TMA-9. SFP Charles Simonyi also has an hour for similarly prepacking and transferring his own gear. Mike L-A has 30 min. for handling the U.S. hardware transfer to Soyuz. *[Excessed cargo and trash go into the Orbital Module (BO) for burning up in the atmosphere. Return cargo comes into the Descent Module (SA), for its landing at the southern landing site in the Kazakhstan region of Jezkazgan on 4/21 (Saturday).]*

Late tonight, Sunita is scheduled to perform the overdue IWIS (Internal Wireless Instrumentation System) memory dump from the balky SM RSU (Remote Sensing Unit) after moving the latter to the Lab and swapping it with the Lab RSU. Afterwards, the RSUs are to be left in the new configuration to support the 13S undock activities on Saturday.

Suni will also service the CGBA-4 (Commercial Generic Bioprocessing Apparatus 4) Science Insert payload by rotating (flipping over) the GHab, CHab-1 (mutant variety) and CHab-2 (wild type) habitats, i.e., turning the sides that face away from the cameras toward the latter. *[The experiment, conducted by and for students from middle and high schools from around the U.S., Canada and Malaysia, deals with growth and movement of worms (soil nematodes, Caenorhabditis elegans).]*

FE-1-15 Kotov is scheduled for the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Working on the IMS (Inventory Management System), CDR-15 Yurchikhin will update/edit its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow,

Baikonur).

Fyodor and Oleg are scheduled for more ISS familiarization & adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

The E-14 crew will work out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR-14, FE-2), TVIS treadmill (CDR-14, FE-1-14) and RED resistive exercise device (FE-2). CDR-15 Yurchikhin and FE-1-15 Kotov will also perform an hour of exercise, both on the RED.

Afterwards, Suni copies the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

VC12 Charles Simonyi is to make the eighth of his scheduled daily entries in the log/questionnaire for the LBP (Low Back Pain) "Muscle" experiment on his Russian laptop. *[As Greg Olsen and Anousheh Ansari did before him, Simonyi is studying the lower back pain which astronauts often experience in the weightless conditions of space, in spite of the fact that the spinal vertebrae are not compressed in micro-G as in gravity (thereby causing back pain). It is hypothesized that lower back pain may indeed develop without compression of the vertebrae from the deep muscle "corset" that is required to keep the lower part of the vertebrae, the sacral bone, in position between the two hipbones. The tonic postural muscles of this corset get "activated" when getting up in the morning and "deactivated" when resting, a protective mechanism which may not work in space where the muscles are known to atrophy over time. This would lead to strain in certain ligaments and consequently pain in the lower back. LBP aims at testing this hypothesis and assessing the level of muscle atrophy in response to micro-G.]*

Working with Oleg Kotov, the SFP performs another culture sampling for his VC12 experiment SAMPLE, which looks for bacteria onboard the station. Samples are also to be taken from Kotov, all to be placed in the KRIOGEM-03M refrigerator. *[Possible contamination by pathogenic organisms is a serious problem on space missions. In weightlessness, some bacteria grow faster than under conditions on Earth, and they are much more antibiotic resistant. However, it is not known whether and to which extent this different behavior of bacteria could affect the health of the crew or damage technical equipment on board. The SFP's SAMPLE experiment, which investigates what kind of microbial species are to be found on the ISS and how these adapt to space environment conditions, consists of Simonyi*

*taking samples from himself and from certain areas of the station by rubbing swab sticks over surfaces susceptible to having bacteria, for example switches, keyboards and personal hygiene equipment.]*

Simonyi is also scheduled to conduct the seventh and last session of his VC12 experiment PILLE-MKS. Later, after his close out ops, Tyurin is to remove the nine sensors and deploy them in the RS at their old paces. *[With PILLE, the SFP has been and is recording sensor measurements from nine PILLE radiation sensors near his work place, then copying their readings on a daily basis to his PC memory card.]*

Additionally, along with his regular daily tagup with his ground support crew in Moscow via channel VHF1 at 2:55am tomorrow morning, Simonyi will continue his activity work on a laptop for email ops.

Also scheduled on Simonyi's timeline are the standard Earth photo/video opportunities, as always assisted by Yurchikhin.

The SFP has one personal IP (Internet Protocol) phone call scheduled at ~8:20pm.

The primary & backup PMCU MDMs (Power Management Controller Unit Multiplexer/Demultiplexer computers) will be swapped by ground commanding in preparation for the upcoming replacement of a failed Lab RPCM (Remote Power Controller Module, LA2B).

*Soyuz 13S Return:* As reported yesterday, 13S Undocking & Landing has been shifted by one day to 4/21 (Saturday) to avoid the usual northern landing zone of Kazakhstan, currently subject to Spring thaw & rain flooding. Landing at the backup site near Jezkazgan, located more southerly, requires a one-day shift. Undocking will be at 5:11:30am EDT, entry interface at 8:08:29am and landing at 8:30:34am (6:30:34pm local Kazakhstan time). Sunset at landing site: 8:23pm local, well within SAR-required flight rules.

Today's CEO (Crew Earth Observation) photo target is **Caracas, Venezuela** (*ISS will have a nadir pass over the capital of Venezuela. The city is located in a valley to the south of the Venezuelan Coast Range. A high-resolution mapping pass slightly to the right and parallel to track will capture a rural-urban-rural transect across the metropolitan area*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/21/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 5:11am) & land (8:30am)  
04/25/07 -- Reboost burn 1  
04/28/07 -- Reboost burn 2 (phasing)  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET) launch date for STS-117/Atlantis/13A launch (S3/S4 trusses)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/09/07 -- NET launch date for STS-118/Endeavour/13A.1 -- S/Hab-SM, S5, ESP3  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/20/07 -- NET launch date for STS-120/Discovery/10A -- Node 2 launch  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
12/06/07 -- NET launch date for STS-122/Atlantis  
01/29/08 -- Progress M-63/28P launch  
02/14/08 -- NET launch date for STS-123/Endeavour  
04/24/08 -- NET launch date for STS-124/Discovery.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/17/07  
**Date:** Tuesday, April 17, 2007 3:13:00 PM  
**Attachments:**

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**ISS On-Orbit Status 04/17/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 9 of joint E14/E15 operations by CDR-14 Miguel Lopez-Alegria, FE-1-14 Mikhail Tyurin, FE-2 Sunita Williams, CDR-15 Fyodor Yurchikhin, FE-1-15 Oleg Kotov, SFP/VC12 Charles Simonyi. Day 212 in space for L-A & Misha.*

Aboard ISS, the E14/E15 crew rotation/handover period continues with full activity schedules for all involved. Crew wakeup is at the currently "normal" 2:00pm EDT; sleep time begins tomorrow morning at 5:30am.

Yurchikhin will be performing the daily checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatchways, including the SM-to-Soyuz tunnel, and the FGB-to-Node passageway. *[This is important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

After CDR-14 Lopez-Alegria and FE-2 Williams have recycled the ALTEA dosimeters, deleted old data files from the CNSM (Central Nervous System Monitoring) laptop and set up the video equipment, Mike L-A will configure the CNSM brain electrode helmet gear for the sixth and final session, with himself the subject and Sunita the operator. Afterwards, L-A will deactivate the hardware and transfer the CNSM data to computer. *[Background: ALTEA measures details about cosmic radiation and its interactions with Astronauts' central nervous system. This involves CNS measurements with a 32-channel EEG (electroencephalograph) of the crewmember, plus accurate long-term real-time particle flux dosimetry (DOSI mode) inside the ISS with six particle detectors (originally introduced on Mir). A specific focus of CNSM is on abnormal visual perceptions (such as the often reported phosphenes, - "light flashes", with eyes closed) and the impact of particles on brain functions in micro-G. For comparison, brain stimulation is also done with "known" optical signals (with eyes open). Subjects record their perceptions with a*

*pushbutton device. ALTEA equipment can be used separately or in any combination, permitting several different experiments: in physics, dosimetry, psychophysics, electrophysiology and cognitive neurophysiology. The NASA-sponsored ALTEA-CNSM, developed by the Italian Space Agency (ASI) and the Italian firm Alenia Spazio, is assigned to Increments 13, 14 and 15. Its predecessor ALTEINO was performed on ISS in April 2002 by Roberto Vittori during his Soyuz taxi mission.]*

Sunita Williams is to configure the Robotics Onboard Trainer (ROBoT) in the Node and, with FE-1-15 Oleg Kotov participating for “generic handover”, perform another SSRMS OBT (Space Station Remote Manipulator System Onboard Training) run using the simulator for honing proficiency in upcoming SSRMS operations. *[ROBoT uses DOUG (Dynamic Operations Ubiquitous Graphics) software, two hand controllers (RHC/Rotational Hand Controller & THC/Translational HC) and two laptops (one for graphics, one for the simulation) for on-orbit training of MSS (Mobile Service System) and SSRMS operations.]*

FE-1-14 Mikhail Tyurin is scheduled for the first 1.5-hour “installment” of his fifth and final training session in the "Chibis" ODNT suit as standard preparation of cosmonauts for returning into gravity. Since the session will be outside an RGS (Russian ground site) comm window, with no telemetry downlink, his vital body readings will be obtained with the Tensoplus sphygmomanometer. A tagup/calldown with ground specialists via US S-band supports the run, which will be assisted by Mike L-A. There will be two more runs, tomorrow and on Thursday. *[The below-the-waist reduced-pressure device ODNT (US: LBNP, Lower Body Negative Pressure) in the "Chibis" garment provides gravity-simulating stress to the body's cardiovascular/circulatory system for reestablishing the body's orthostatic tolerance (e.g., the Gauer-Henry reflex) after the six-month stay in zero-G. Tyurin's ODNT protocol today again consisted of first imbibing 150-200 milliliters of water or juice, followed by a sequence of progressive regimes of reduced (“negative”) pressure, set at -25, -30, -35 and -40 mmHg for five minutes each, then at -25, -30, and -40 mmHg, 10 minutes in each mode, and at -30 mmHg for 5 min, while shifting from foot to foot at 10-12 steps per minute. The body's circulatory system interprets the pressure differential between upper and lower body as a gravity-like force pulling the blood and body fluids “down”.]*

Oleg Kotov will work on the VC12 experiment suite, first activating and configuring the KRIOGEM-03 thermostatic refrigerator (at -22 degC), then placing five BIOEMULSION ice-packs in the cooler. Afterwards, Kotov dismantles and stows BIOTREK, BIOEKOLOGIYA (BTKh-14), ANTIGEN (BTKh-31) and BIORISK (BIO-2) experiment containers & kits in the Soyuz TMA-9 Descent Module for return to Earth.

Mikhail Tyurin is scheduled to conduct the periodic cabin air sampling for subsequent analysis on the ground. *[Tyurin will use the IPD- NH<sub>3</sub> Draeger tubes sampler to test for ammonia (NH<sub>3</sub>) in the SM and then employ the AK-1M adsorber to collect air samples in the SM and FGB.]*

The FE-1 will also use standard ECOSFERA equipment, set up yesterday, to conduct microbial air sampling runs for the MedOps SZM-MO-21 experiment, with the POTOK Air Purification System temporarily powered down, taking samples from cabin surfaces along with samples from crewmembers for sanitation and disease studies. The sample tubes will then be stowed on TMA-9 for Earth return. *[The equipment, consisting of an air sampler set, a charger and power supply unit, provides samples to help determine microbial contamination of the ISS atmosphere, specifically the total bacterial and fungal microflora counts and microflora composition according to morphologic criteria of microorganism colonies.]*

Sunita will power down the VOA (Volatile Organics Analyzer) in the CHeCS (Crew Health Care Systems) rack, preparatory to troubleshooting the system which yesterday showed an anomaly (error message).

Afterwards, CDR-15 Yurchikhin is to test the cabin atmosphere by sampling in the SM (Service Module) with the CMS (Counter Measure System) Trace Contaminant Analyzer which allows real-time gas monitoring of potential harmful contaminants (HCHO/Formaldehyde, CO/Carbon Monoxide, NH<sub>3</sub>/Ammonia, O<sub>3</sub>/Ozone, plus Benzene) in special CMS chip cassettes. *[All measured data are later to be dumped from memory device to the ground via OCA.]*

Kotov will activate the gas analyzer (GA) in the Soyuz TMA-10 spacecraft early tomorrow morning.

Yurchikhin is scheduled for troubleshooting a power failure of the FDS (Fire Detection System) data processor (BOI SPO) in the DC1 Docking Compartment by swapping the Nr. 2 and Nr. 3 IDZ-2 smoke detectors. *[The DC1's BOI SPO's fire detection Enable/Disable and power up/down for the R&R is to be radio-commanded from the ground.]*

Supported by ground specialist tagup, Kotov is to begin a two day IFM (Inflight Maintenance) of the Russian BITS2-12B onboard telemetry measurement system, replacing the BSR interface unit to the payload TM channel. Today, Oleg routes a cable from the EGE2 laptop to the RSS2 laptop, prepares RSS2 and then deinstalls the current BSR-2 interface unit. Tomorrow's job is to install the BITS2-12's array matching device & interface unit (BSR-TM) instead of BSR-2 and test it with RSS1. *[The BSR-TM Regul interface unit is part of the Russian radio control &*

*communications system.]*

Suni Williams meanwhile will spend half an hour in the Node-to-Lab vestibule, installing an EPS (Electrical Power System) jumper cable (W2004) which will provide power to Node 2 from Lab resources when “Harmony” is temporarily installed on Node 1 (“Unity”). *[Some systems will be powered down to safe the connectors before the jumper can be installed, including Airlock UOP (Utility Outlet Panel), Airlock lights and Airlock ATUs (Audio Terminal Units).]*

FE-1-15 Kotov is scheduled for the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection.

Working on the IMS (Inventory Management System), CDR-15 Yurchikhin will update/edit its standard “delta file”, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The E-14 crew will work out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR-14, FE-2), TVIS treadmill (FE-1-14) and RED resistive exercise device (CDR-14, FE-2). CDR-15 Yurchikhin and FE-1-15 Kotov will also perform an hour of exercise, both on the CEVIS.

Afterwards, Suni copies the crewmembers’ exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

FE-1 Tyurin will have another 1.5 hrs for packing items for return on 13S.

Fyodor and Oleg are scheduled for more ISS familiarization and adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

For the voluntary “Saturday Science” program on 4/21 (or Sunday/Monday), payload scientists have offered Suni the choice of one or both of two EPO (Education Payload Operations) demos, dealing with (1) CFE VG2 (Capillary Flow Experiment Vane Gap 2) and (2) Hobbies (crew discussing their favorite hobbies while on ISS). Her decision will be downlinked tomorrow morning.

VC12 Charles Simonyi is to make the seventh of his scheduled daily entries in the log/questionnaire for the LBP (Low Back Pain) "Muscle" experiment on the Russian laptop turned over to him, as Greg Olsen and Anousheh Ansari did before him.

Simonyi is also scheduled to conduct the sixth sessions of his two VC-12 experiments PILLE-MKS and MATRITSA Z1 (Matrix Z1). *[With PILLE, the SFP records sensor measurements from nine PILLE radiation sensors near his work place, then copies their readings on a daily basis to his PC memory card. MATRIX Z1 consists of two phases: (1) Study the degradation (noise level) of CCD (charge-coupled device) arrays in HDV (high-definition video) camcorders under spaceflight conditions in the ISS RS, and (2) take test Earth imagery through a window with a camera for later determination of the CCD's noise level. Today's activity centers on Phase 2 filming, preparing and recording Video 6, followed by post-video closeout ops,]*

Additionally, after his regular daily tagup with his ground support crew in Moscow via channel VHF1 at 2:40am tomorrow morning, Simonyi will continue his activity work on a laptop for email ops.

Also scheduled on Simonyi's timeline are the standard Earth photo/video opportunities, as always assisted by Yurchikhin.

The SFP will make two IP (Internet Protocol) phone calls to Space Adventures, at 3:38pm and 5:15pm.

At ~2:35pm, Yurchikhin will conduct a ham radio exchange with amateur operators at Kursk State Technical University in Russia. *[The Kursk students already have had ham sessions with Expeditions 4, 5, and 6, and are planning three more with Expedition 15,- in June (International Student Forum "Slavianskoye Sodruzhestvo" in Dagomys, in July from the Solovets Islands, and in early August from the peak of Mt. Elbrus.)]*

At ~3:00pm EDT, Simonyi is scheduled for a ham radio session with the city of Bristow, USA.

At ~4:40pm, the combined ISS crews is scheduled to conduct their traditional Changing-of-Command ceremony, as Expedition 14 (Mikhail Tyurin, Michael Lopez-Alegria) turn ISS operations over to Expedition 15 (Fyodor Yurchikhin, Oleg Kotov, Sunita Williams). The brief ceremony will be transmitted to the ground via Ku- & S-band for broadcast on NASA TV. With this, stewardship of the space station is officially transferred to the new crew.

Early tomorrow morning, at ~3:05am, Yurchikhin and Kotov will downlink a video

message of greetings to the participants of the 8<sup>th</sup> Russian Olympiad “Sozvezdie” (“Constellation”), a science and technology competition among young people with emphasis on environmental protection projects, arranged annually by organizations of the City of Korolev and the GCTC (Gagarin Cosmonauts Training Center) Research Institute.

*Update on Soyuz 13S Return:* The Russian Commission has approved shifting 13S Undocking & Landing by one day to 4/21 (Saturday) to avoid the usual northern landing zone of Kazakhstan, currently subject to Spring thaw flooding. Landing more southerly requires a one-day shift. Undocking will be at 5:11:30am EDT, entry interface at 8:08:29am and landing at 8:30:34am (6:30:34pm Kazakhstan time). Sunset at landing site: 10:23am, i.e., well within SAR-required flight rules.]

*Update on Suni's In-Space Boston Marathon:* FE-2 Williams yesterday ran the Boston Marathon using the TVIS treadmill equipment. Suni, an accomplished runner, finished in 4 hrs 24 min, nearly two hours behind the top female finisher, thus becoming the first person to do so in space. She will receive a finishing certificate and medal and her time will be recorded along with the contestants who were actually in Massachusetts for the race. *[The TVIS functioned normally throughout the event, showing only minor fraying of one gyro wire rope, a normal wear occurrence.]*

*Update on IWIS:* Yesterday's download of IWIS (Internal Wireless Instrumentation System) structural dynamics data from the 13S relocation by L-A was completed except for the SM RSU (Remote Sensing Unit). Plans are being developed to transfer the SM RSU to the Lab for data download.

Today's CEO (Crew Earth Observation) photo target is **Jornada Basin, New Mexico** (*weather is predicted to be clear over New Mexico, giving the crew an opportunity for high-resolution mapping of this LTER [Long Term Ecological Research] site. Overlapping nadir frames taken along track will provide a spring-season dataset for time-series analysis of vegetation and soil change.*

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:09am EDT [= epoch]*):

Mean altitude -- 333.5 km

Apogee height – 344.3 km

Perigee height -- 322.8 km  
Period -- 91.20 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0015963  
Solar Beta Angle -- 32.2 deg (magnitude peaking)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in last 24 hours -- 100 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 48118

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/21/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 5:11am) & land (8:30am)  
04/25/07 -- Reboost burn 1  
04/28/07 -- Reboost burn 2 (phasing)  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/08/07 -- "Not earlier than" (NET) launch date for STS-117/Atlantis/13A launch (S3/S4 trusses)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/09/07 -- NET launch date for STS-118/Endeavour/13A.1 -- S/Hab-SM, S5, ESP3  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
10/20/07 -- NET launch date for STS-120/Discovery/10A -- Node 2 launch  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
12/06/07 -- NET launch date for STS-122/Atlantis  
01/29/08 -- Progress M-63/28P launch  
02/14/08 -- NET launch date for STS-123/Endeavour  
04/24/08 -- NET launch date for STS-124/Discovery.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/16/07  
**Date:** Monday, April 16, 2007 11:28:54 AM  
**Attachments:**

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### **ISS On-Orbit Status 04/16/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 30 of Increment 14. Day 8 of joint E14/E15 operations. Day 211 in space for L-A & Misha.*

Aboard ISS, the E14/E15 crew rotation/handover period continues with full activity schedules for all involved. Crew wakeup is at the currently "normal" 2:00pm EDT; sleep time begins tomorrow morning at 5:30am.

Fyodor Yurchikhin will perform the daily checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatchways, including the SM-to-Soyuz tunnel, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

FE-1-15 Oleg Kotov serviced the Russian Harmful Impurities Removal System (BMP), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The bake-out will be terminated at ~4:15am EDT. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

CDR Lopez-Alegria will be working on the IWIS (Internal Wireless Instrumentation System), performing a memory dump from the RSUs (Remote Sensing Units) which includes some troubleshooting. *[During last week's scheduled IWIS download, an unknown issue prevented the files being saved on SSC 7 (Station Support Computer 7). As a result, L-A will be using SSC 4 for this activity.]*

As part of the standard Change-of-Command procedures, Tyurin, Yurchikhin and Kotov will sign the usual formal Russian protocol certifying RS handover/acceptance as specified in an RPS (handover) document, proper transfer of

emergency procedures documents, and a list of the cargo items stowed on Progress M-59/24P for deorbit. *[Two copies of the ISS RS Handover Protocol will be printed out and signed. The first copy remains on ISS, the second copy will be returned to the ground on Soyuz TMA-9/13S.]*

Fyodor and Oleg have about 2 hrs scheduled for ISS familiarization and adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

FE-1 Tyurin will have another 1.5 hrs for packing items for return on 13S.

Kotov is to undertake the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 30-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Last recharging of the Motorola-9505 Iridium satellite phone, today to be handled by Yurchikhin with Tyurin's "handover" guidance. *[After retrieving it from its location in the Soyuz TMA-9 descent module (BO), Fyodor initiates the recharging of its lithium-ion battery, a 30-min. process, monitoring the process every 10-15 minutes as it takes place. Upon completion, the phone will be returned inside its SSSP Iridium kit and stowed it back in the BO's operational data files (ODF) container. The satphone accompanies returning ISS crews on Soyuz reentry & landing for contingency communications with SAR (Search-and-Rescue) personnel after touchdown. The Russian-developed procedure for the monthly recharging has been approved jointly by safety officials. During the procedure, the phone is left in its fire-protective fluoroplastic bag with open flap.]*

Charles Simonyi and Oleg Kotov again have time reserved for scheduled commemorative (Russian: "symbolic") activity, a standard tradition for visiting guests and departing expedition crewmembers, usually consisting of signing and stamping envelopes and imaging other memorabilia. Kotov today will sign, stamp and photograph religious items.

Wearing protective gear, Kotov will perform routine service on the ASU toilet facility in the Service Module (SM) by replacing its pretreat container (E-K) plus hose with a new assembly and discarding the old one. *[E-K contains five liters of pre-treat solution, - a mix of H<sub>2</sub>SO<sub>4</sub> (sulfuric acid), CrO<sub>3</sub> (chromium oxide, for oxidation and purple color), and H<sub>2</sub>O (water). The pre-treat liquid is mixed with water in a dispenser (DKiV) and used for toilet flushing.]*

Mike L-A and Sunita are scheduled, at ~8:45pm EDT, for a teleconference with ground specialists to discuss their upcoming EPO IPY (Educational Payloads Operation/International Polar Year) demo, to be video recorded for educational institutions.

After Kotov, with Tyurin's help, yesterday set up the necessary pump/hose plumbing to the Progress 24P cargo ship and compressed the tank bladder of its BV2 water tank, today Yurchikhin will undertake liquid waste transfer from two filled EDV-U urine containers to the BV2 tank and then flush the lines with water. *[Each of the Progress' two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before receiving the liquid waste.]*

In preparation for an upcoming microbial air sampling session, Misha Tyurin is to unstow the MedOps SZM-MO-21 ECOSFERA equipment and initiate charging on the Ecosphere power pack (BP). *[The equipment, consisting of an air sampler set, a charger, power supply unit, and incubation tray for Petri dishes, determines microbial contamination of the ISS atmosphere, specifically the total bacterial and fungal microflora counts and microflora composition according to morphologic criteria of microorganism colonies.]*

On the TVIS (Treadmill with Vibration Isolation & Stabilization) with SLDs (Subject Loading Devices), FE-2 Williams will perform the regular weekly and monthly maintenance, primarily inspecting the condition of the SLDs, SLD cables and SPDs (Subject Positioning Devices), lubricating as required, plus recording time & date values.

FE-1-15 Kotov is scheduled for the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection.

Working on the IMS (Inventory Management System), CDR-15 Yurchikhin will update/edit its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

VC12 Charles Simonyi is to make the sixth of his scheduled daily entries in the log/questionnaire for the LBP (Low Back Pain) "Muscle" experiment on the Russian laptop turned over to him. *[As Greg Olsen and Anousheh Ansari did before him, Charles is studying the lower back pain which astronauts often experience in the*

*weightless conditions of space, in spite of the fact that the spinal vertebrae are not compressed in micro-G as in gravity (thereby causing back pain). It is hypothesized that lower back pain may indeed develop without compression of the vertebrae from the deep muscle “corset” that is required to keep the lower part of the vertebrae, the sacral bone, in position between the two hipbones. The tonic postural muscles of this corset get “activated” when getting up in the morning and “deactivated” when resting, a protective mechanism which may not work in space where the muscles are known to atrophy over time. This would lead to strain in certain ligaments and consequently pain in the lower back. LBP aims at testing this hypothesis and assessing the level of muscle atrophy in response to micro-G.]*

Simonyi is also scheduled to conduct the fifth session of his VC-12 experiment PILLE-MKS. *[With PILLE, the SFP records sensor measurements from nine PILLE radiation sensors which Tyurin has moved near Simonyi’s work place on the first day, then copies their readings on a daily basis to his PC memory card.]*

Additionally, after his regular daily tagup with his ground support crew in Moscow via channel VHF1, Simonyi will continue his activity work on a laptop for email ops.

Also scheduled on Simonyi’s timeline are the standard Earth photo/video opportunities, assisted by Yurchikhin.

Starting at ~1:15pm, the E14 crew & SFP Simonyi will spend four hours in the TMA-9 Descent Module (SA) to conduct the Soyuz descent drill, a standard training exercise for every crew returning on a Soyuz. The exercise, which strictly forbids any command activation (except for switching the InPU display), will be supported by a tagup and discussions with ground instructor at TsUP/Moscow via S-band. *[The session includes a review of the pertinent ODFs (operational data files), specifically the books on Soyuz Ascent & Descent Procedures, Emergency Descents, and Off-Nominal Situations, crew responsibilities when executing the flight program, visual crew recognition of SUS (Entry Control System) failures, spacesuit procedures, etc., with special emphasis on operations with the Neptune-ME cockpit console. The training uses a Descent Simulator application on the RSK1 laptop. During the actual descent, Tyurin, as Soyuz CDR, will occupy the middle couch, with Simonyi in the right seat and Lopez-Alegria in the Descent Module’s left Kazbek couch. Pending the final State Commission decision at about 3.5h before undocking, 13S return is expected for 4/20 (next Friday), with undocking at 6:21am EDT and landing near Arkalyk/Kazakhstan at 9:36am. (Note: a slip of one day for 13S return is being discussed since the planned landing site in Kazakhstan is currently not in a condition acceptable for touchdown due to Spring thaw flooding.)*

The E-14 crew will work out on their regular 2.5-hr. physical exercise program

(about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR-14), TVIS treadmill (FE-1-14, FE-2) and RED resistive exercise device (CDR-14, FE-2). CDR-15 Yurchikhin and FE-1-15 Kotov will also perform an hour of exercise on the RED.

Afterwards, Misha copies the crewmembers' exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

There will be three PAO TV interviews from the ISS during the day:

1. A downlink from SFP Simonyi and the 14S crew to TsUP at 3:45pm EDT, and
2. Two interviews with Florida Today newspaper & WOIO TV at 6:10pm for L-A and Suni.

In addition, at 7:10pm, Simonyi is scheduled for a ham radio session with students of Redmond High School in Redmond, Washington, USA.

No CEO (Crew Earth Observation) photo target requests uplinked today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:21am) & land (9:36am)

04/25/07 -- Reboost burn 1

04/28/07 -- Reboost burn 2 (phasing)

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/08/07 -- "Not earlier than" launch date for STS-117/13A launch (S3/S4 trusses)

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/15/07  
**Date:** Sunday, April 15, 2007 6:54:43 PM  
**Attachments:**

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### **ISS On-Orbit Status 04/15/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – but not a crew rest day. Day 7 of joint E14/E15 operations: CDR-14 Miguel Lopez-Alegria, FE-1-14 Mikhail Tyurin, FE-2 Sunita Williams, CDR-15 Fyodor Yurchikhin, FE-1-15 Oleg Kotov, SFP/VC12 Charles Simonyi. Day 210 in space for L-A & Misha.*

Aboard ISS, the E14/E15 crew rotation/handover period continues with full activity schedules for all involved. Crew wakeup was back at 2:00pm EDT; sleep time begins tomorrow morning at 5:30am.

Tyurin, Yurchikhin and Kotov again have 2 hrs crewtime between them for dedicated E14/E15 handover activities. In addition, there are “generic” handovers where crewmembers are scheduled together to complete various designated standard tasks.

CDR-15 Fyodor Yurchikhin began the day with historical/promotional photography of a DVD disk against a Service Module (SM) window showing the Earth.

With FE-1 Mikhail Tyurin assisting for “generic handover”, FE-1-15 Oleg Kotov performed the periodic regeneration of the Russian Harmful Impurities Removal System (BMP) by starting the “bake-out” cycle to vacuum on absorbent bed #1 of the dual-channel filtration system. The bake-out will be terminated at ~5:00am EDT. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

Tyurin dismantled the two “Klest” (KL-152) TV cameras and their light units in the Soyuz TMA-10/14S Descent Module for return to the ground on 13S, temporarily stowing them in the SM.

After setting up the necessary pump/hose plumbing, Kotov, with Tyurin assisting, prepared for liquid waste transfer to the BV2 water tank of the Progress M-59/24P cargo ship-turned-trash can by compressing the tank bladder to expel any left-over contents and testing for hermeticity several times during the day. Tomorrow, Oleg is scheduled to transfer urine from filled EDV-U liquid waste containers to the BV2 tank, then flush the line with water. *[Each of the Progress' two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before receiving the liquid waste.]*

Kotov also performed preventive maintenance/servicing on RS (Russian segment) ventilation systems, cleaning Group A fans in the SM.

Misha Tyurin and Mike Lopez-Alegria have about 5hr 45m scheduled between them for prepacking hardware destined for return to Earth on the Soyuz 13S Descent Module or for disposal on the 13S Habitation Module.

Later tonight, Tyurin and Kotov are to run another internal pressure check on the spare BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator, to check for hermeticity. The unit was charged by Misha on 4/6 with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#21), for the second time. *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

Oleg Kotov is scheduled to terminate the periodic condensate water processing from EDV container using the BPK Condensate Feed Unit which he started yesterday.

As is standard for new Expeditions, Yurchikhin and Kotov are to perform the periodic 3-hr. routine maintenance job on the RS (Russian segment)'s STTS telephone/telegraph subsystem, including inspection and audio health checks of all comm panels (PA) in and between the SM, FGB and DC1, VHF receiver tests, and an audit of headsets. *[The "Voskhod-M" STTS enables telephone communications between the SM, FGB, Docking Compartment (DC-1) and U.S. segment (USOS), and also with users on the ground over VHF channels selected by an operator at an SM comm panel, via STTS antennas on the SM's outside. There are six comm panels in the SM with pushbuttons for accessing any of three audio channels, plus an intercom channel. Other modes of the STTS include telegraphy (teletype), EVA voice, emergency alarms, Packet/Email, and TORU docking support. Last time done: 10/02/06.]*

For the upcoming new sessions with the ROBot (Robotics Onboard Trainer) hardware, Mikhail will install new software in the ROBot laptop via DVD/CD-RW. *[ROBoT uses DOUG (Dynamic Operations Ubiquitous Graphics) software, a hand controller and two laptops (one for graphics, one for the simulation) for on-orbit training of MSS (Mobile Service System) and SSRMS (Space Station Remote Manipulator System) operations.]*

Oleg is scheduled to test new software for ECON photography delivered on 14S via USB stick and installed on the Russian RSKL1 laptop. *[KPT-3 photography for the Russian Environmental Safety Agency (ECON) has been a frequent earth observing experiment.]*

FE-2 Williams will conduct the scheduled monthly inspection of the RED (Resistive Exercise Device) with canister cords and accessory straps as well as the canister bolts for re-tightening if required.

Kotov is up today for the routine daily maintenance of the SM's SOZh system, including the ASU toilet facilities systems/replaceables.

CDR-15 Yurchikhin will work on the IMS (Inventory Management System), updating/editing its standard "delta" file, including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Using his Russian laptop, VC12 Charles Simonyi made the fifth of his scheduled daily entries in the log/questionnaire for the LBP (Low Back Pain) "Muscle" experiment. *[As Greg Olsen and Anousheh Ansari did before him, Charles is studying the lower back pain which astronauts often experience in the weightless conditions of space, in spite of the fact that the spinal vertebrae are not compressed in micro-G as in gravity (thereby causing back pain). It is hypothesized that lower back pain may indeed develop without compression of the vertebrae from the deep muscle "corset" that is required to keep the lower part of the vertebrae, the sacral bone, in position between the two hipbones. The tonic postural muscles of this corset get "activated" when getting up in the morning and "deactivated" when resting, a protective mechanism which may not work in space where the muscles are known to atrophy over time. This would lead to strain in certain ligaments and consequently pain in the lower back. LBP aims at testing this hypothesis and assessing the level of muscle atrophy in response to micro-G.]*

Simonyi is also scheduled to conduct the fourth session of his VC-12 experiment PILLE-MKS. *[With PILLE, the SFP records sensor measurements from nine PILLE radiation sensors which Tyurin has moved near Simonyi's work place on the first day, then copies their readings on a daily basis to his PC memory card.]*

Additionally, after his regular daily tagup with his ground support crew in Moscow via channel VHF1, Simonyi will continue his activity work on a laptop for email ops and on the IP (Internet Protocol) phone for private conference (~10:30pm).

Also scheduled on Simonyi's timeline are the standard Earth photo/video opportunities.

No CEO (Crew Earth Observation) photo target requests uplinked today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:21am) & land (9:36am)  
04/25/07 -- Reboost burn 1  
04/28/07 -- Reboost burn 2 (phasing)  
TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)  
TBD -- STS-117/13A docking  
TBD -- STS-117/13A undocking  
TBD -- STS-117/13A landing @ KSC  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-1806/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking

09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/14/07  
**Date:** Saturday, April 14, 2007 9:25:48 PM  
**Attachments:**

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### **ISS On-Orbit Status 04/14/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday, but not an off-duty day. Day 6 of joint E14/E15 operations: CDR-14 Miguel Lopez-Alegria, FE-1-14 Mikhail Tyurin, FE-2 Sunita Williams, CDR-15 Fyodor Yurchikhin, FE-1-15 Oleg Kotov, SFP/VC12 Charles Simonyi. Day 208 in space for L-A & Misha.*

Aboard ISS, the E14/E15 crew rotation/handover period continues with full activity schedules for all involved. Crew wakeup moved earlier by one hour, to 1:00pm EDT; sleep time begins tomorrow morning at 5:30am.

Tyurin, Yurchikhin and Kotov again have more than 7 hrs crewtime between them for dedicated E14/E15 handover activities. In addition, there are "generic" handovers where crewmembers are scheduled together to complete various designated standard tasks.

Fyodor Yurchikhin performed the (currently) daily checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatchways, including the SM-to-Soyuz tunnel, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

Preparatory to Soyuz TMA-9/13S undocking on 4/20, Tyurin and Lopez-Alegria spent an hour in the 13S Descent Module (SA) for a preliminary descent checkout and subsequently supported the standard ground-commanded hot fire test of the spacecraft's SUD motion control system. After pressurizing the KDU combined propulsion system propellant tanks & pressurization tanks, the standard 1-minute hot fire test with the thrusters was conducted at ~3:55pm. *[KDU comprises both maneuver and attitude control engines of the Soyuz. For the test, station attitude*

*was handed over to Russian thruster control at 3:10pm, commanded to free drift at 3:54pm, and after the test returned back to LVLH XVV (local vertical local horizontal/ x-axis in velocity vector). Attitude control was handed over to USOS momentum management at 3:55pm.]*

FE-2 Williams completed an audit of the current ISS plug-in configuration.

FE-1-15 Kotov performed the periodic condensate water processing from EDV container using the BPK Condensate Feed Unit.

Afterwards, Kotov activated the gas analyzer (GA) in the Soyuz TMA-10 spacecraft, while Tyurin similarly activated the GA in the Soyuz-TMA-9.

Oleg Kotov had two hours set aside for unstowing and setting up the equipment for the BTC-10 CARDIOCOG experiment, then performing the first session of the procedure on FE-1 Tyurin. *[CARDIOCOG studies changes in the human cardiovascular system in micro-G, expressed in the peripheral arteries, and the vegetative regulation of arterial blood pressure (BP) and heart rate (HR) plus ECG (electrocardiogram). For the experiment, Oleg had to take Misha's systolic & diastolic blood pressure measurements, heart rate data and ECG, using a finger cuff, the Cardiopocog-CARD kit with PTP-10 Portapress power and an electrode vest, and then stored the data on the RSE1 laptop for subsequent copying to a PCMCIA card and downlinking to the ground via OCA.]*

FE-2 Williams configured the ER1 (EXPRESS Rack 1) by connecting its MTL (Moderate Temperature Loop) cooling jumper QDs (quick disconnects) to the nearby LAB1O2 UIP (Utility Interface Panel, "Z-panel"), to prepare for the use of SAMS (Space Acceleration Measuring System) to monitor the 13S departure from the Service Module (SM) aft end port.

Sunita was also charged with the periodic off-loading of the Lab condensate tank to a CWC (Contingency Water Container).

Other activities by the crew included -

- an audit of TVIS SLD (Subject Load Devices) gear and transfer of outdated MEC (Medical Equipment Computer) from the CTB (Cargo Transfer Bag) containing the SLD, by Sunita Williams,
- performance of his fourth preliminary LBNP (ODNT) Lower Body Negative Pressure device training by FE-1-14 Tyurin, assisted by Lopez-Alegria,
- scheduled regular maintenance of CSA-CP (Compound Specific Analyzer-Combustion Products) instruments, with the regular subsequent spot check, by Sunita,
- E14 closeout ops of the ALTCRISS (Alteino Long Term monitoring of

Cosmic Rays on the ISS) experiment and data downlink from memory card via OCA (supported by tagup with a ground specialist) by FE-1-14 Tyurin, and

- familiarization with the onboard OpsLAN computer network by Fyodor and Oleg,
- the periodic check of the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the MATRYOSHKA-R payload in the DC1 Docking Compartment by the FE-1-14.

Yurchikhin will do the routine daily maintenance of the SM's SOZh system, including the ASU toilet facilities systems/replaceables.

The CDR-15 will also work on the IMS (Inventory Management System), updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The E-14 crew is working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), and RED resistive exercise device (CDR, FE-2).

For the second time, Oleg Kotov and Fyodor Yurchikhin also use the physical exercise equipment, today working out on the RED for one hour each.

Afterwards, Suni copies L-A's, Misha's, Oleg's, Fyodor's and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Mike L-A and Suni are scheduled for their weekly PFCs (Private Family Conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop), Mike at ~3:30am, Suni at 6:55pm.

Using his Russian laptop, VC12 Charles Simonyi made the fifth of his scheduled daily entries in the log/questionnaire for the LBP (Low Back Pain) "Muscle" experiment. *[As Greg Olsen and Anousheh Ansari did before him, Charles is studying the lower back pain which astronauts often experience in the weightless conditions of space, in spite of the fact that the spinal vertebrae are not compressed in micro-G as in gravity (thereby causing back pain). It is hypothesized that lower back pain may indeed develop without compression of the vertebrae from the deep muscle "corset" that is required to keep the lower part of the vertebrae, the sacral bone, in position between the two hipbones. The tonic postural muscles of this corset get "activated" when getting up in the morning and "deactivated" when resting, a protective mechanism which may not work in space where the muscles*

*are known to atrophy over time. This would lead to strain in certain ligaments and consequently pain in the lower back. LBP aims at testing this hypothesis and assessing the level of muscle atrophy in response to micro-G.]*

Simonyi was also scheduled to conduct the fourth sessions of his two VC-12 experiments PILLE-MKS and MATRITSA Z1 (Matrix Z1). *[With PILLE, the SFP records sensor measurements from nine PILLE radiation sensors which Tyurin has moved near Simonyi's work place on the first day, then copies their readings on a daily basis to his PC memory card. MATRIX Z1 consists of two phases: (1) Study the degradation (noise level) of CCD (charge-coupled device) arrays in HDV (high-definition video) camcorders under spaceflight conditions in the ISS RS, and (2) take test Earth imagery through a window with a camera for later determination of the CCD's noise level. Today's activity centers on Phase 2 filming, completing Videos 4 & 5, followed by post-video closeout ops,]*

Additionally, after his regular daily tagup with his ground support crew in Moscow via channel VHF1, Simonyi will continue his activity work on a laptop for email ops and on the IP (Internet Protocol) phone for private conference (~11:40pm).

The SFP and the E15 crew have their standard PMCs (Private Medical Conferences) scheduled, as is customary for all new arrivals.

### **Weekly Science Update** (*Expedition Fourteen -- 29<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* PCMCIA card was replaced on 4/5. Facility reported to perform nominally. Close-out activity for Inc14 is underway.

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BASE:* Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA):* Complete.

*CBOSS (Cellular Biotechnology Support Systems):* Complete.

*CFE (Capillary Flow Experiment):* "Thanks for choosing us for Saturday Science on 4/7. We had great operation and the PI is now evaluating the data."

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing*

*Apparatus*): Nominal video and telemetry continues to be received on the ground..

*CULT (Cultural Factors Questionnaire)*): Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test)*): Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM)*): Complete.

*EPO (Educational Payload Operation)*): The NASA crewmembers were thanked for their participation in the EPO Communications Demo this week. "The EPO team is happy with the results."

*ETD (Eye Tracking Device)*): Complete.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology)*): Planned

*GRAVI (Threshold Acceleration for Gravisensing)*): Complete.

*IMMUNO (Saliva Sampling)*): Complete.

*LEUKIN*): Complete.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*): Planned.

*MISSE (Materials ISS Experiment)*): Ongoing.

*MTR-2 (Russian radiation measurements)*): Passive dosimeters measurements in DC1 "Pirs".

*NOA (Nitric Oxide Analyzer)*): Complete.

*NUTRITION*): "Suni, your Increment 15 sessions will be carried in an Inc 15-based Summary".

*PFE-OUM (Periodic Fitness Evaluation - Oxygen Uptake Measurement)*): "Suni, your Increment 15 sessions will be carried in an Inc 15-based Summary".

*PK-3 (Plasma Crystal 3)*): In progress.

*PMDIS (Perceptual Motor Deficits in Space)*): Complete.

*POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G):* Complete.

*RC (Refrigerated Centrifuge):* Planned.

*RS (Renal Stone):* Complete.

*SAMPLE:* Complete.

*SEM (Space Experiment Module):* Complete.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Surface, Water & Air Biocharacterization):* This week L-A and Suni conducted a SWAB surface and air sampling collection. L-A collected air samples and Suni surface samples.

*TRAC (Test of Reaction & Adaptation Capabilities):* All three E14 crewmembers participated in yesterday's TRAC session.

*TROPI (Study of Novel Sensory Mechanism in Root Phototropism):* Complete.

*U/S TDI (Ultrasound Tissue Doppler Imaging):* "LA: Thanks to your efforts, the Ultrasound team is in the process of closing the anomaly report on the ECG cable. Also, with the TDI option enabled, the ultrasound will be able to support some upcoming experiment."

*YING (Yeast in No Gravity):* Complete.

*CEO (Crew Earth Observations):* Through 4/9 the ground has received a total of 7,271 of ISS/CEO images for review and cataloging. "Only 86 images were received since last week's report, but they included a session of the best 800mm views of Mount Kilimanjaro ever acquired from the ISS. Kudos for these excellent photos of a challenging target! This weekend the NASA/GSFC Earth Observatory website will publish your rare and striking image of the Isles of Sicily. You acquired a remarkably fair-weather shot of this tiny archipelago just off storm-swept Land's End of southwest England. Good eye!"

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:21am) &

land (9:36am)

04/25/07 -- Reboost burn 1

04/28/07 -- Reboost burn 2 (phasing)

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)

06/01/07 -- Russian EVA-1806/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)

06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)

07/07/07 -- STS-118/13A.1 undocking (NET)

07/12/07 -- STS-118/13A.1 landing (NET)

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch

08/18/07 -- Progress M-61/26P docking (DC1)

08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*

08/26/07 -- STS-120/10A -- Node 2 launch

08/28/07 -- STS-120/10A -- Node 2 docking

09/04/07 -- STS-120/10A undocking

09/07/07 -- STS-120/10A landing

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15 launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing

Late Oct/early Nov -- US EVA-10,-11,-12

11/??/07 -- Progress M-62/27P launch

01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 04/13/07

**Date:** Friday, April 13, 2007 6:41:51 PM

**Attachments:**

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**ISS On-Orbit Status 04/13/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 5 of joint E14/E15 operations: CDR-14 Miguel Lopez-Alegria, FE-1-14 Mikhail Tyurin, FE-2 Sunita Williams, CDR-15 Fyodor Yurchikhin, FE-1-15 Oleg Kotov, SFP/VC12 Charles Simonyi. Day 207 in space for L-A & Misha.*

Aboard ISS, the E14/E15 crew rotation/handover period continues with full activity schedules for all involved. Crew wakeup again was at 2:00pm EDT; sleep time begins tomorrow morning at 4:30am.

Tyurin, Yurchikhin and Kotov again have almost 4.5 crewtime between them for dedicated E14/E15 handover activities. In addition, there are "generic" handovers where crewmembers are scheduled together to complete various designated standard tasks.

Oleg Kotov performed the (currently) daily checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatchways, including the SM-to-Soyuz tunnel, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

The three crewmembers undertook another run, their seventh, with the NASA-sponsored German/Canadian experiment TRAC (Test of Reaction & Adaptation Capabilities). CDR Lopez-Alegria set up the video gear and assembled the TRAC hardware in the work area (i.e., laptop, joystick, headphones, and time box). Afterwards, Sunita, Mikhail and L-A performed their individual data take sessions. Later, the CDR closed out and stowed the equipment. (Done last: 4/2), *[TRAC tests the idea that the decrease in motor skills reported by some astronauts (for example, hand-eye coordination), is due to the brain adapting to being in space. By testing hand/eye coordination of crewmembers, scientists hope to test the theory*

*that while the brain is adapting its sensory-motor functions to space it is unable to fully provide the resources necessary to perform normal manual skills, i.e., the data will be used to show that adaptation to zero-G draws on resources normally used for computational tasks, for example. Crewmembers test their hand-eye coordination prior to the mission, while on orbit and then again when they have returned to Earth. TRAC hardware includes a laptop mounted to a table and a joystick to control the cursor on the PC screen. Also used are audio headphones and a reaction time box to respond to audio and visual stimuli. For the test the crewmember is sitting on the floor of the Lab module, with legs restrained and the work table on the legs.]*

CDR-15 Fyodor Yurchikhin, “tutored” by Tyurin, set up Laptop 3 and the Russian “Relaksatsiya” spectrometer & video camera at Service Module (SM) window 12, then began his first session of the Plasma-ISS (Bridge-2) experiment. *[The experiment studies near-station and ISS surface electroplasmic processes and their effects on ISS systems and elements. The US solar arrays create static-electricity potentials on the structure, and two PCUs (Plasma Contactor Units) are commonly used during EVA (or tests) to emit Xenon plasma to keep shell surface potentials at <40V. Because of the high orbital speed (i.e. high collision energy between the Xenon plasma and atmospheric oxygen) a weak optical emission (glow) can be observed. The experiment uses the onboard “Relaksatsiya” (“relaxation”) equipment with its Fialka-MV-Kosmos multispectral hardware (spectrometer, video camera plus Laptop 3 software) to observe the PCU plasma jet emission luminescence from SM windows #12 & #13 today.]*

As part of generic handovers, FE-1-15 Kotov performed preventive maintenance/ servicing on RS (Russian segment) ventilation systems, cleaning Group A fans in the SM and replacing the PS1 & PS2 ventilation filters in the FGB.

Oleg is to perform the periodic collection of air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

On L-A’s timeline for today is another periodic atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit).

Batteries are to be replaced if necessary. *[CSA-CP measurements are to be gathered with the new 12A.1 units #1051 (prime) & #1044 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the*

*CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #2007 for CO<sub>2</sub> in SM (panel 449) and Lab, along with battery ticks. The instruments will be turned off afterwards, except for #1051, and returned to their regular locations.]*

Still working on the SM's plumbing system, Kotov continued the current (Week 29) water sampling activity for return to Earth begun 4/10, collecting condensate (KAV) samples upstream of the powered-down SRVK-2M's gas-liquid mixture filter (FGS), using a compressor to transfer the sample and then packing it for return to the ground..

The two new E15 arrivals, Fyodor Yurchikhin & Oleg Kotov, have time reserved for familiarizing themselves with the onboard CMS (Crew Medical Systems) exercise equipment.

Afterwards, CDR-15 will transfer the newly arrived IMAK (ISS Medical Accessory Kit) from Soyuz 14S to the SM.

Sunita Williams will complete her regular FFQ (Food Frequency Questionnaire), her 16<sup>th</sup>, on the MEC (Medical Equipment Computer). Lopez-Alegria's FFQ, his 28<sup>th</sup>, will be filled out tomorrow. The FFQs keep a personalized log of the astronauts' nutritional intake over time on special MEC software. *[Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Mike L-A is to do the regular bi-weekly maintenance reboot of the SSC (Station Support Computer) File Server and OCA Comm Router laptops as well as the weekly reboot of the PCS (Portable Computer System) A31p laptops.

Williams is up for the routine daily maintenance of the SM's SOZh system, including the ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection.

Fyodor will work on the IMS, updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The E-14 crew will work out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (CDR, FE-1) and RED resistive exercise device (CDR, FE-2).

For the first time, Oleg Kotov and Fyodor Yurchikhin also use the physical exercise

equipment, working out on the CEVIS for one hour each.

Afterwards, Misha copies L-A's, Suni's, and his own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Using his Russian laptop, VC12 Charles Simonyi is making the fifth of his scheduled daily entries in the log/questionnaire for the LBP (Low Back Pain) "Muscle" experiment.

Simonyi also conducts the fourth sessions of his two VC-12 experiments PILLE-MKS and MATRITSA Z1 (Matrix Z1). *[With PILLE, the SFP records sensor measurements from nine PILLE radiation sensors which Tyurin has moved near Simonyi's work place on the first day, then copies their readings on a daily basis to his PC memory card. MATRIX Z1 consists of two phases: (1) Study the degradation (noise level) of CCD (charge-coupled device) arrays in HDV (high-definition video) camcorders under spaceflight conditions in the ISS RS, and (2) take test Earth imagery through a window with a camera for later determination of the CCD's noise level. Today's activity centers on Earth filming, followed by post-video closeout ops,]*

Additionally, after his regular daily tagup with his ground support crew in Moscow via channel VHF1, Simonyi continues his activity work on a laptop for email ops and on the IP (Internet Protocol) phone for private conference (~10:00am).

The standard Earth photo/video opportunities are again scheduled on Simonyi's timeline.

Simonyi, Yurchikhin, Kotov and Tyurin also will spend about two hours with scheduled commemorative (Russian: "symbolic") activities, a standard tradition for visiting guests and departing expedition crewmembers, today signing and stamping several dozen 14S envelopes. *[The activity involves 45 envelopes for Roskosmos and 60 envelopes with the 14S/VC12 mission logo. Also included in the symbolic activities are paintings by the artist Shilov, which the crew signed and stamped, with a certificate that the paintings were on ISS, and a photo/video record of everything.]*

The SFP will also conduct Session 2 of the SAMPLE experiment, collecting samples in support of the study of species composition of microorganisms inhabiting the ISS.

Closing out the current experiment run of the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, Mikhail Tyurin will collect samples of the growth

products for return to Earth. *[Rasteniya researches growth and development of plants (currently barley and peas) under spaceflight conditions in the Lada-10 greenhouse.]*

Mike L-A is scheduled for a procedures review for an upcoming EPO (Educational Payloads Operation) demo, dealing with the IPY (International Polar Year).

Sunita will meanwhile update/reconfigure the leak check kit and print out new leak repair procedures.

There are two PAO TV downlinks from the ISS scheduled during the day:

1. A TV message of greetings from crews for Charles Simonyi's website (<http://www.charlesinspace.com>) at 4:15pm EDT, and
2. TV greetings for a NASA Award Ceremony in Houston at 6:35pm.

**Significant Events Ahead** *(all dates Eastern and subject to change):*

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:21am) & land (9:36am)

04/25/07 -- Reboost burn 1

04/28/07 -- Reboost burn 2 (phasing)

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)

06/01/07 -- Russian EVA-1806/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)

06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)

07/07/07 -- STS-118/13A.1 undocking (NET)

07/12/07 -- STS-118/13A.1 landing (NET)

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch

08/18/07 -- Progress M-61/26P docking (DC1)

08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*

08/26/07 -- STS-120/10A -- Node 2 launch

08/28/07 -- STS-120/10A -- Node 2 docking

09/04/07 -- STS-120/10A undocking

09/07/07 -- STS-120/10A landing

10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/12/07  
**Date:** Thursday, April 12, 2007 6:49:20 PM  
**Attachments:**

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### **ISS On-Orbit Status 04/12/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 4 of joint E14/E15 operations: CDR-14 Miguel Lopez-Alegria, FE-1-14 Mikhail Tyurin, FE-2 Sunita Williams, CDR-15 Fyodor Yurchikhin, FE-1-15 Oleg Kotov, SFP/VC12 Charles Simonyi. Day 206 in space for L-A & Misha.*

Today Russia observes **Denj Kosmonavtov** (Cosmonauts Day) -- celebrating Yuri Gagarin's pioneering flight into space 46 years ago. And NASA is observing the 26<sup>th</sup> anniversary of STS-1, the first Space Shuttle mission to orbit. *[Yuri Alexeyevich was accepted into the cosmonaut unit in 1960, at age 26. After his historic 108-min. flight around the Earth in "Vostok 1", which ended with a parachute ejection at 7 km altitude over a farm field near the city of Engels in Saratov Oblast (province), he was promoted to unit leader. Seven years later, on March 27, 1968, Yuri died with a flight instructor in a fighter jet crash. Chief Designer of the thusly inaugurated Soviet human space program was Sergey Pavlovich Korolev. Exactly 20 years later, John Young and Bob Crippen took the Columbia into space for a test mission lasting 2 days 6 hours 20 minutes 52 seconds.]*

Aboard ISS, the E14/E15 crew rotation/handover period continues with full activity schedules for all involved. Crew wakeup again was at 2:00pm EDT; sleep time begins tomorrow morning at 5:30am.

Tyurin, Yurchikhin and Kotov again have over 6.5 hrs crewtime between them for dedicated E14/E15 handover activities. In addition, there are "generic" handovers where crewmembers are scheduled together to complete various designated standard tasks.

Mike Lopez-Alegria and Sunita Williams will spend ~3.5 hrs in the U.S. Airlock working on EMU (Extravehicular Mobility Unit) resizing, backpack parts replacing and LCVG (Liquid Cooling & Ventilation Garments) filling, getting the gear ready for EVA during Increment 15. *[The activities also included an inspection of L-A's EMU*

*for possible damage sustained during the last EVA from some small piece of orbital debris seen on video to contact the suit and fly away.]*

Fyodor Yurchikhin performed the (currently) daily checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatchways, including the SM-to-Soyuz tunnel, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

After Tyurin's second session yesterday with the Russian biomedical PILOT experiment (MBI-15), today Oleg Kotov and Mike L-A are having their turn with the piloting skill test which requires a table, ankle restraint system and control handles for "flying" simulations on a laptop (RSK1) under stopwatch control. After conducting the experiment, Yurchikhin will disassemble the Pilot-P work site and stow the gear, updating the IMS (Inventory Management System). *[The "pilots" have to perform three flight control modes (fixed, slow and fast free-flyer), each one at least five times, after checkout and calibration of the control handles. The setup of the configured work maintenance area is to be photo-documented with the Nikon D1X. Results will be stored on the RSK1 disk for return to Earth, and the photos are to be downlinked to the ground via OCA. Before these last two sessions MBI-15 was done the last time by Valery Tokarev in November 2005 and is also planned for Fyodor Yurchikhin and Oleg Kotov in Increment 15.]*

Tending the SOZh (Environment Control & Life Support System) plumbing system in the Service Module (SM), Kotov removed and replaced the filter/reactor in the powered-down SRVK-2M Condensate Water Processor. *[The old filter will be stowed for disposal on Progress 24.]*

Then, still working on the plumbing system, the FE-1-15 continued the current (Week 29) water sampling activity for return to Earth begun 4/10, collecting condensate (KAV) samples upstream of the powered-down SRVK-2M's gas-liquid mixture filter (FGS).

L-A and Sunita were scheduled for the weekly audit/inventory of the available CWCs (Contingency Water Containers) and their contents, to update the ground's critical tracking of onboard water supplies.

Later, Williams works on Soyuz cargo deliveries, unpacking and stowing the U.S. items brought up by 14S.

Afterwards, FE-2 will prepare the HRM (Heart Rate Monitor) with new personalized E15 software delivered on Soyuz.

Mike L-A's & Suni's timelines today also include a debriefing session on onboard ESA payload activities, specifically on ALTEA (Anomalous Long Term Effects on Astronauts) and PMDIS/TRAC (Perceptual-Motor Deficits in Space/Test of Reaction and Adaptation Capabilities).

The E-14 crew is working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2) and RED resistive exercise device (CDR, FE-2).

Afterwards, Misha copies L-A's, Suni's, and his own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Mike L-A is up for the routine daily maintenance of the SM's SOZh system, including the ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection.

Fyodor will work on the IMS, updating/editing its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Using his Russian laptop, VC12 Charles Simonyi is to make the fourth of his scheduled daily entries in the log/questionnaire for the LBP (Low Back Pain) "Muscle" experiment. *[As Greg Olsen and Anousheh Ansari did before him, Charles is studying the lower back pain which astronauts often experience in the weightless conditions of space, in spite of the fact that the spinal vertebrae are not compressed in micro-G as in gravity (thereby causing back pain). It is hypothesized that lower back pain may indeed develop without compression of the vertebrae from the deep muscle "corset" that is required to keep the lower part of the vertebrae, the sacral bone, in position between the two hipbones. The tonic postural muscles of this corset get "activated" when getting up in the morning and "deactivated" when resting, a protective mechanism which may not work in space where the muscles are known to atrophy over time. This would lead to strain in certain ligaments and consequently pain in the lower back. LBP aims at testing this hypothesis and assessing the level of muscle atrophy in response to micro-G.]*

Simonyi conducted the third sessions of his two VC-12 experiments PILLE-MKS and MATRITSA Z1 (Matrix Z1). *[With PILLE, the SFP records sensor measurements from nine PILLE radiation sensors which Tyurin has moved near Simonyi's work place on the first day, then copies their readings on a daily basis to his PC memory card. MATRIX Z1 consists of two phases: (1) Study the*

*degradation (noise level) of CCD (charge-coupled device) arrays in HDV (high-definition video) camcorders under spaceflight conditions in the ISS RS, and (2) take test Earth imagery through a window with a camera for later determination of the CCD's noise level. Today's activity centers on Phase 2 filming, followed by post-video closeout ops,]*

Additionally, after his regular daily tagup with his ground support crew in Moscow via channel VHF1, Simonyi continues his activity work on a laptop for email ops and on the IP (Internet Protocol) phone for private conference (~12:40am).

The SFP and the E15 crew have their standard PMCs (Private Medical Conferences) scheduled, as is customary for all new arrivals.

Simonyi, Yurchikhin, Kotov and Tyurin also will spend about two hours with scheduled commemorative (Russian: "symbolic") activities, a standard tradition for visiting guests and departing expedition crewmembers, today signing and stamping several dozen 14S envelopes. *[The activity involves 45 envelopes for Roskosmos and 60 envelopes with the 14S/VC12 mission logo. Also included in the symbolic activities are paintings by the artist Shilov, which the crew signed and stamped, with a certificate that the paintings were on ISS, and a photo/video record of everything.]*

There are two PAO TV downlinks from the ISS during the day:

A televised message of greetings from the E-14 & E-15 crews dedicated to the 40<sup>th</sup> Anniversary of Jamestown, via S- and Ku-band at ~3:00pm EDT, and a press conference with Russian media and the daily show Malakhov on Moscow Channel One, with Nikolay Didenko singing a song for the crew.

Also, with the Kenwood radio in the SM powered up for his use, at ~2:55pm VC12 Charles Simonyi conducts a 10-min ham radio exchange with amateur operators in the US city of Fireborn via the ARISS (Amateur Radio on ISS) organization. A second ham radio session is scheduled for Charles at 7:10pm with amateur operators in Budapest, Hungary, his home country.

**Significant Events Ahead** *(all dates Eastern and subject to change):*

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:26m) & land (9:46am)

04/25/07 -- Reboost burn 1

04/28/07 -- Reboost burn 2 (phasing)

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-1806/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 04/11/07  
**Date:** Wednesday, April 11, 2007 2:04:08 PM  
**Attachments:**

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### **ISS On-Orbit Status 04/11/07**

All ISS systems continue to function nominally, except those noted previously or below. *Day 3 of joint E14/E15 operations. Day 205 in space for L-A & Misha.*

Aboard ISS, the E14/E15 crew rotation/handover period is continuing with full activity schedules for all involved. Crew wakeup again is at 2:00pm EDT; sleep time begins tomorrow morning at 5:30am.

Fyodor, Oleg and Mikhail will join up for about 1.5 hrs of dedicated handover time. In addition, there are "generic" handovers where crewmembers are scheduled together to complete various designated standard tasks.

CDR-15 Yurchikhin's daily job currently is the checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatchways, including the SM-to-Soyuz tunnel, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

In the Service Module (SM), FE-1-15 Oleg Kotov continues the current (Week 29) water sampling activity for return to Earth begun yesterday, using empty drinking bags (or food container) to collect condensate (KAV) samples upstream of the Water Purification Column Unit (SRV-K2M BKO) several times during the day, then replacing the sampler for flushing the gear each time. *[Later, he will remove the sampler, disassemble the setup and dump the flush water.]*

FE-1-14 Tyurin and Kotov, as generic handover, are also to undertake the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from*

*getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

In addition, Kotov will transfer accumulated U.S. condensate from the collection CWC (Contingency Water Container) to an EDV container through a filter under Tyurin's tutelage.

The periodic USOS hatch seal inspection (Node forward & aft starboard, Lab aft and Joint Airlock) in support of ACS (atmospheric control system) maintenance (last time done: 1/22/07), originally hard scheduled today for FE-2 Williams, has now been moved to her discretionary "job jar" task list. *[The seal inspection/cleaning usually is done with the vacuum cleaner which, however, is currently off limits due to a newly discovered internal electrical safety hazard. Although any necessary seal cleaning could instead be done with sticky gray tape, the resulting uncertainty in required crewtime for doing the job has moved it to the task list for the time being.]*

Sunita and Oleg are timelined for a handover familiarization & checkout session with the CMRS (Crew Medical Restraint System), followed by a checkout of the RSP (Respiratory Support Pack).

Doing his first IFM (inflight maintenance) in the RS, Yurchikhin will remove and replace a faulty TM168-04 temperature sensor (parameter T278) behind SM panel 325.

CDR-14 Lopez-Alegria has three hours set aside for a comprehensive audit/inventory of personal crew provisions, to support improved manifest planning by ground specialists.

Later, Mike L-A will also conduct the periodic inspection/audit of the current "plug-in" setup, i.e., checking which electric outlets on ISS control panels are powering which equipment (either continuously or as-needed) against an uplinked plug-in plan (PIP).

Sunita Williams will do IMS(Inventory Management System)-supported inventorying, consolidation and stowage of exercise equipment for the Expedition 15, including newly arrived items.

Suni also is to conduct the periodic checkout and preventive maintenance on the U. S. OGS (Oxygen Generation System). *[The maintenance consists of cycling of the H<sub>2</sub>, O<sub>2</sub>, and water valves within the OGS every 90 days until OGS activation, to prevent stiction. The OGS, launched on ULF1.1 to provide early checkout, will not be functional until modification kits are installed after ULF2.]*

Oleg Kotov will set up for his first biweekly NOA/Nitric Oxide Analyzer (MBI-21) session and undertake the procedure, later filling in the electronic log book on the RSE1 laptop. *[Purpose of the ESA experiment ESANO1, last performed by Thomas Reiter, consisting of the "Platon" analyzer and its power supply, is to monitor expired nitric oxide (NO) in the subject's exhaled air to detect signs of airway inflammation and indications of venous gas emboli (bubbles) that may be caused by inhalation of pollutants in the closed environment of the ISS cabin and increased risk of decompression sickness.]*

Mikhail Tyurin is scheduled for his second session with the Russian biomedical PILOT experiment (MBI-15), which requires a table, ankle restraint system and control handles for testing piloting skill in "flying" simulations on a laptop (RSK1) under stopwatch control. After conducting the experiment, the Pilot-P gear will be left in place, to be used by Kotov and L-A tomorrow. *[Misha has to perform three flight control modes (fixed, slow and fast free-flyer), each one at least five times, after checkout and calibration of the control handles. The setup of the configured work maintenance area is to be photo-documented with the Nikon D1X. Results will be stored on the RSK1 disk for return to Earth, and the photos are to be downlinked to the ground via OCA. Before Misha and L-A, MBI-15 was done the last time by Valery Tokarev in November 2005 and is also planned for Fyodor Yurchikhin and Oleg Kotov in Increment 15.]*

Misha will also conduct the second session of the Russian PNEVMOCARD experiment, set up 3/15, using new software on the reconfigured RSE-Med A31p laptop and the TENSOPPLUS sphygmomanometer to measure arterial blood pressure. *[PNEVMOCARD has the purpose to acquire new scientific information to refine the understanding about the mechanisms used by the cardio respiratory system and the whole body organism to spaceflight conditions. By recording (on PCMCIA cards) the crewmember's electrocardiogram, impedance cardiogram, low-frequency phonocardiogram (seismocardiogram), pneumotachogram (using nose temperature sensors), and finger photoplethysmogram, the experiment supports integrated studies of (1) the cardiovascular system and its adaptation mechanisms in various phases of a long-duration mission, (2) the synchronization of heart activity and breathing factors, as well as the cardiorespiratory system control processes based on the variability rate of physiological parameters, and (3) the interconnection between the cardiorespiratory system during a long-duration mission and the tolerance of orthostatic & physical activities at the beginning of readaptation for predicting possible reactions of the crewmembers organism during the their return to ground.]*

FE-2 Williams is to perform her routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly

mounted and cables are correctly connected.

The E-14 crew will work out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2) and RED resistive exercise device (CDR, FE-2).

Afterwards, Misha copies L-A's, Suni's, and his own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

FE-1-15 Kotov is up for the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection.

Working on the IMS, Yurchikhin will update/edit its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Using his Russian laptop, the SFP will make the third of his scheduled daily entries in the log/questionnaire for the LBP (Low Back Pain) "Muscle" experiment. *[As Greg Olsen and Anousheh Ansari did before him, Charles is studying the lower back pain which astronauts often experience in the weightless conditions of space, in spite of the fact that the spinal vertebrae are not compressed in micro-G as in gravity (thereby causing back pain). It is hypothesized that lower back pain may indeed develop without compression of the vertebrae from the deep muscle "corset" that is required to keep the lower part of the vertebrae, the sacral bone, in position between the two hipbones. The tonic postural muscles of this corset get "activated" when getting up in the morning and "deactivated" when resting, a protective mechanism which may not work in space where the muscles are known to atrophy over time. This would lead to strain in certain ligaments and consequently pain in the lower back. LBP aims at testing this hypothesis and assessing the level of muscle atrophy in response to micro-G.]*

Simonyi is also scheduled to conduct the second sessions of his two VC-12 experiments PILLE-MKS and MATRITSA Z1 (Matrix Z1). *[With PILLE, the SFP will record sensor measurements from nine PILLE radiation sensors which Tyurin first collects from their nominal exposure locations and places near Simonyi's work place. The SFP then copies their readings on a daily basis to his PC memory card. MATRIX Z1 consists of two phases: (1) Study the degradation (noise level) of CCD (charge-coupled device) arrays in HDV (high-definition video) camcorders under spaceflight conditions in the ISS RS, and (2) take test Earth imagery through a*

*window with a camera for later determination of the CCD's noise level.]*

After his regular daily tagup with his ground support crew, Simonyi will continue his activity work on a laptop for email ops and on the IP (Internet Protocol) phone for private conference.

There will be another series of PAO TV downlinks from the (very popular) ISS during the day:

1. An interview with reporters from CNN (Kate Tobin) and CBS News (Peter King, Bill Harwood) at 7:25pm EDT for all crewmembers,
2. a televised conference with Roskosmos, RSC-Energia, GCTC and IMBP in Moscow at 1:40am,
3. a teleconference with the City of Engels in Saratov Province at 2:30am for Fyodor, Oleg and Mikhail for Cosmonautics Day,
4. a televised downlink to a Russian Student Song Club at 3:00am,
5. a message of greetings on Cosmonauts Day to the Russian Flight Control Team (GOGU) at TsUP at 3:05am, and
6. greetings from Russia's First Deputy Prime Minister S.B. Ivanov, on the TsUP/GCTC loop (S-band) at 4:05am.

Also, at 4:15am, Mike L-A is scheduled for another crew discretionary personal conference via S- and Ku-band.

Charles Simonyi, with the Kenwood radio in the SM powered up for his use, at 6:50pm is to conduct a 10-min ham radio exchange amateur operators in Budapest, Hungary, his home country. A second ham radio session is scheduled for Charles at 12:45am with amateur operators in Seattle USA via the ARISS (Amateur Radio on ISS) organization. *[Interesting gossip: According to Charles, as told to Misha Tyurin, Bill Gates is also considering joining the celebrity group of space tourists at some point in time.]*

At ~11:45pm, Sunita Williams will have a ham radio chat with students at Salt Creek Primary School, Salt Creek, Australia.

No CEO (Crew Earth Observation) photo target requests uplinked today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:21am) & land (9:36am)  
04/25/07 -- Reboost burn 1  
04/28/07 -- Reboost burn 2 (phasing)  
06/08/07 -- STS-117/13A launch -- S3/S4 trusses -- ("Not-Earlier-Than" date!) **[NET date added]**  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-1806/07/07 -- Russian EVA-19  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/??/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET) **[date added]**  
08/??/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET) **[date added]**  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/10/07  
**Date:** Tuesday, April 10, 2007 2:19:24 PM  
**Attachments:**

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### **ISS On-Orbit Status 04/10/07**

All ISS systems continue to function nominally, except those noted previously or below. >>>Last evening, ISS completed **48,000 orbits** of Earth since launch of FGB/Zarya eight and a half years ago, having covered a distance of 2.02 billion km (1.26 billion miles) or ~20 times the distance to Mars and back.<<< Week 29 of Increment 14. Day 2 of joint E14/E15 operations. Day 204 in space for L-A and Misha.

Aboard ISS, the E14/E15 crew rotation/handover period went underway with full activity schedules for all involved. Crew wakeup today was at a heavily shifted 2:00pm EDT; sleep time will be tomorrow morning at 5:30am.

In the Soyuz TMA-10/14S Habitation Module, FE-1-14 Mikhail Tyurin is scheduled to install the LKT local temperature sensor commutator (TA251M1B) of the BITS2-12 onboard telemetry system and its ROM/read-only memory unit (PZU TA765B), both kept in storage from an earlier Soyuz.

CDR-15 Fyodor Yurchikhin, FE-1-15 Oleg Kotov and FE-1-14 Mikhail Tyurin will join up in about 2.5 hours of dedicated handover time. In addition, there are "generic" handovers where crewmembers are scheduled together to complete various designated standard tasks.

As usual, the ISS RODFs (Russian Operations Data Files) will be updated by Tyurin and Yurchikhin with new books and sheets delivered on 14S, including a special "Taxi Mission 12" book. [TMA-9/13S is now set up for Lopez-Alegria, Tyurin and Simonyi, while TMA-10/14S has become the contingency CRV (crew return vehicle) for Yurchikhin, Kotov and Williams.]

The CDR-15 is to conduct the periodic (currently daily) checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatchways, including the SM-

to-Soyuz tunnel, and the FGB-to-Node passageway. *[This is especially important when the ventilation/circulation system has to cope with a larger crew on board, currently six persons, and one of the two Russian SKV air conditioners down (SKV-1).]*

Mikhail Tyurin is scheduled for the third one-hour "installment" of his final training session in the "Chibis" ODNT suit as standard preparation of cosmonauts for returning into gravity. Since the session will be outside an RGS (Russian ground site) comm window, with no telemetry downlink, his vital body readings will be obtained with the Tensoplus sphygmomanometer. A tagup/calldown with ground specialists via US S-band supports the run, which will be assisted by Mike L-A. *[The below-the-waist reduced-pressure device ODNT (US: LBNP, Lower Body Negative Pressure) in the "Chibis" garment provides gravity-simulating stress to the body's cardiovascular/circulatory system for reestablishing the body's orthostatic tolerance (e.g., the Gauer-Henry reflex) after the six-month stay in zero-G. Tyurin's ODNT protocol today again consisted of first imbibing 150-200 milliliters of water or juice, followed by a sequence of progressive regimes of reduced ("negative") pressure, set at -15, -25, -35 and -40 mmHg for five minutes each, then at -20, -30, and -40 mmHg, 10 minutes in each mode, and at -30 mmHg for 5 min, while shifting from foot to foot at 10-12 steps per minute. The body's circulatory system interprets the pressure differential between upper and lower body as a gravity-like force pulling the blood and body fluids "down".]*

In the Lab, FE-2 Sunita Williams will be working on the two HRF (Human Research Facility) A31p laptops, changing out their "Ultrabay" adapters. Afterwards, she will perform an IP address reset on one of the PCs (HRF Laptop 2).

On one of the UIPs (Utility Interface Panels, "Z-panels", LAB1D3) in the Lab, Williams will perform a polarity check, after proper safing by the ground, by connecting a Systems Rack Power jumper at the J1 plug of the UIP and measuring polarity at the other end.

L-A and Sunita are to collect a fluid sample from the ITCS MTL (Internal Thermal Control System Moderate Temperature Loop) port for return to the ground.

Kotov meanwhile also takes water samples, collecting potable water specimen from the Water Distribution & Heating Unit (BRP-M), from the Hot tap into an EDP sample container, and from the second spigot (lukewarm) into empty drink bags, for return to Earth. The water used for line flushing will be disposed of into an EDV container. *[Curiously, there is no really cold water anywhere on the ISS!]*

Later, Sunita is timelined for 45 min for cleaning the Node aft hatch window. *[For the cleaning, she will be using water from the SM galley and turn cabin lights off/on*

*for pre- & post-cleaning inspection. She will also use the SONY PD100 camcorder to tape pre- & post-cleaning footage of the window for ground inspection.]*

Major science activities in the Russian segment (RS) by Misha, Oleg and Fyodor today are focused on the biotechnological experiment CONJUGATION (Pairing), KUBIK refrigerator operations, BIOEMULSION and PLAZMIDA. *[CONJUGATION: removal of the Recomb-K hybridization experiment from the KRIOGEM-03M cooler, process activation at ambient temperature, photography of Recomb-K hardware, completing activation and returning to KRIOGEM at +4 degC. KUBIK-AMBER: removal of PLAZMIDA and insertion in KRIOGEM at +4 degC, with photography of Recomb-K ops. BIOEMULSION: photography, KT deactivation, bioreactor retrieval and setup in KRIOGEM, retrieval of payload from Soyuz Habitation Module and transfer to Service Module (SM) for stowage.]*

CDR Lopez-Alegria is scheduled to do an audit/inventory (number and location) of onboard storage pouches containing headset batteries.

As another generic handover, Sunita and Fyodor are to perform the standard weekly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), checking the condition of the roller bearings and record its time & date values.

The E-14 crew will work out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2) and RED resistive exercise device (CDR, FE-2).

The FE-2 is up for the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection.

Working on the IMS (Inventory Management System), Yurchikhin will update/edit its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

Misha Tyurin also has 40 min reserved for conducting an audit/inventory of OpsLAN network and computer hardware, tagging up with a ground specialist to report each component to TsUP/Moscow. *[Involved are the seven Russian laptops RSK1, RSE1, RSE-Med, RSS1, RSS2, TP2 and Laptop 3, with their HDDs (Hard Disk Drives), CD-R/DVD drives, floppy drives, battery packs, power supplies and cables, etc.]*

Before the audit, Tyurin will assist VC-12 Charles Simonyi in installing his removable HDD on the RSE laptop for today's SFP (Spaceflight Participant)

activities.

Working on the laptop, the SFP will make the second of his scheduled daily entries in the log/questionnaire for the LBP (Low Back Pain) "Muscle" experiment. *[As Greg Olsen and Anousheh Ansari did before him, Charles is studying the lower back pain which astronauts often experience in the weightless conditions of space, in spite of the fact that the spinal vertebrae are not compressed in micro-G as in gravity (thereby causing back pain). It is hypothesized that lower back pain may indeed develop without compression of the vertebrae from the deep muscle "corset" that is required to keep the lower part of the vertebrae, the sacral bone, in position between the two hipbones. The tonic postural muscles of this corset get "activated" when getting up in the morning and "deactivated" when resting, a protective mechanism which may not work in space where the muscles are known to atrophy over time. This would lead to strain in certain ligaments and consequently pain in the lower back. LBP aims at testing this hypothesis and assessing the level of muscle atrophy in response to micro-G.]*

Simonyi is also scheduled to conduct the first sessions on two of his VC-12 experiments, PILLE-MKS and MATRITSA Z1 (Matrix Z1). *[With PILLE, the SFP will record sensor measurements from nine PILLE radiation sensors which Tyurin first collects from their nominal exposure locations and places near Simonyi's work place. The SFP then copies their readings on a daily basis to his PC memory card. MATRIX Z1 consists of two phases: (1) Study the degradation (noise level) of CCD (charge-coupled device) arrays in HDV (high-definition video) camcorders under spaceflight conditions in the ISS RS, and (2) take test Earth imagery through a window with a camera for later determination of the CCD's noise level.]*

After his regular daily tagup with his ground support crew at TsUP, Simonyi will also continue his activity work on a laptop for email ops and on the IP (Internet Protocol) phone for private conference.

As is standard procedure for newly arrived station residents, SFP Simonyi and the E-15 crew have their daily PMCs (Private Medical Conferences). Yesterday, all crewmembers were reported to be in excellent condition (no motion disturbances).

There will be a whopping five PAO TV downlinks from the ISS during the day:

- (1) a conference with Patriarch Alexis II of the Russian Orthodox Church at 4:45 pm EDT for Misha, Fyodor & Oleg,
- (2) followed by a second exchange with Alexis at 5:00pm for L-A, Sunita & Charles,
- (3) a news conference with the entire crew at 5:30pm with US media gathered at NASA Centers,
- (4) another news conference, at 1:45am, with Russian media at TsUP/

Moscow, and

(5) a telephone conference at 5:05am by L-A, Misha, Suni, Fyodor, Oleg & Charles with leaders of Saratov Oblast (the Russian province where Yuri Gagarin landed 46 years ago Thursday).

Also, at 5:20am, Mike L-A is scheduled for another crew discretionary personal conference via S- and Ku-band.

In addition, with the Kenwood radio in the SM powered up for his use yesterday, at ~11:25pm Charles is to conduct a 10-min ham radio exchange with amateur operators in Seattle USA via the ARISS (Amateur Radio on ISS) organization.

No CEO (Crew Earth Observation) photo target requests uplinked today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:42am EDT [= epoch]*):

Mean altitude -- 334.2 km

Apogee height -- 345.0 km

Perigee height -- 323.5 km

Period -- 91.22 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0016002

Solar Beta Angle -- 56.9 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 80 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 48007

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:21am) & land (9:36am)

04/25/07 -- Reboost burn 1 **[added]**

04/28/07 -- Reboost burn 2 (phasing) **[added]**

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-1806/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/09/07  
**Date:** Monday, April 09, 2007 3:20:15 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 04/09/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 29 of Increment 14. The crew's wake/sleep cycle, today at 11:30am – 4:00am EDT, will be adjusted once more tomorrow for the 14S docked period (workday: 2:00pm – 5:30am). Day 203 in space for L-A and Misha.*

**Soyuz TMA-10/14S docked smoothly** at the FGB nadir port at 3:10pm EDT, two minutes ahead of time, carrying Expedition 15 crewmembers Fyodor Yurchikhin (CDR) and "rookie" Oleg Kotov (FE-1, at the controls) plus American "taxi cosmonaut" Charles Simonyi. After about 1.5 hrs spent in Soyuz on pre-transfer activities, the crew is currently scheduled to open hatches at ~4:30pm, followed by crew transfer, the traditional joyful welcome event, and installation of the BZV QD (quick disconnect) clamps by Tyurin and Kotov. *[After successful "kasaniye" (contact), automatic "sborka" (closing of Soyuz & SM port hooks & latches) took place shortly thereafter. Attitude control authority was handed over to the Russian MCS (Motion Control System) at ~11:25am, to be returned to US CMG control at ~3:50pm. For the 14S docking, the Russian SM thrusters were disabled during Soyuz volume pressurization & clamp installation and returned to active attitude control after sborka. Before hatch opening, the crew is performing leak checks of the Soyuz modules and the Soyuz/ISS interface vestibule. They will then doff their Sokol suits and set them up for drying, deactivate the Atmosphere Purification Unit (BOA) in the Descent Module (SA), replace the Soyuz ECLSS LiOH cartridges, equalize Soyuz/ISS pressures, and put the spacecraft into conservation mode on ISS integrated power.]*

Before the docking, the ISS crew prepared for the arrival by turning off the Vozdukh CO<sub>2</sub> scrubber (CDRA is running), activating the A31p laptop in the FGB for the video/comm transmission from the Russian segment (RS), configuring station comm (STTS) for the docking, and turning off the ham radio in the FGB to prevent

RF interference. Upon docking, Tyurin also switched hatch KVDs (pressure equalization valves) between FGB and Soyuz to electric control mode.

After the arrival and crew greetings at ~4:40pm EDT, to be videoed down from the Russian segment (RS) via US Ku-band downlink, the ISS crew will reestablish nominal STTS comm configuration in hardline mode (MBS). Then, FE-1-14 Tyurin immediately begins with payload transfers from Soyuz to ISS and set-ups.

High-priority transfers to the Service Module (SM) for the E-13/E-14 crew rotation period involve

- BIOEMULSIYA bioreactor (to be set up in the KRIOGEM-03M cooler at +4 degC, with photography);
- KONYUGATSIYA in its Biokont-T container (also in KRIOGEM);
- REGENERATSIYA hardware, with photography, and
- the new PLAZMIDA experiment, set up in the KUBIK AMBER temp-controlled unit, activated by Tyurin earlier today at +37 degC.

*[REGENERATSIYA (Regeneration, BIO-12) researches the impacts of micro-G on structural and functional recovery of damaged organs and tissues in Planaria (water flatworms) in the Cryogem-3M cooler/glove box. KONYUGATSIYA (Conjugation, BTKh-10) deals with the processes of genetic material transmission using bacterial conjugation, in the Biokont-T container and Rekomb-K hardware in the KRIOGEM-03M. BIOEMULSIYA (Bioemulsion, BTKh-14) investigates the design and improvement of a closed-type autonomous (thermostat-controlled) bioreactor for obtaining biomass of organisms and bioactive substances (BAV) without additional ingredients input or removal of metabolism products, for bacterial, enzymatic, and pharmaceutical preparations. PLAZMIDA concerns the study of microgravity effects on plasmid transfer and mobilization frequencies in bacteria (a "plasmid" being a DNA molecule separate from the chromosomal DNA and capable of autonomous replication. Typically circular and double-stranded, it usually occurs in bacteria).]*

All new arrivals will receive the obligatory standard Safety Briefing that familiarizes them with procedures and escape routes in case of an emergency. *[The Briefing includes pointing out the location of the "Emergency Response/Visiting Crew" books, shows how to move about the station without getting hurt or accidentally disturbing air flow meters/sensors (PP IP-1) and familiarizes the SFP (Spaceflight Participant) with his switch to a different Soyuz for return.]*

FE-1-14 Tyurin also takes Simonyi on a one-hour guided tour of the ISS, acquainting him with both segments and assisting him in his first PMC (Private Medical Conference) via Russian VHF, email ops, and private family conference using the IP (Internet Protocol) phone.

FE-1-15 Oleg Kotov and Tyurin will swap out Simonyi's IELK (Individual Equipment

& Liner Kit, Russian: USIL) between the two Soyuz vehicles, TMA-9/13S & TMA-10/14S, including the tailored Sokol spacesuit after its dryout. The IELKs of Kotov and CDR-15 Yurchikhin are already in the 14S spacecraft, which now becomes the Expedition 15 CRV (crew return vehicle), good for a maximum of 200 days in space. *[A crewmember is not considered transferred until her/his IELK, AMP (Ambulatory Medical Pack) and ALSP (Advanced Life Support Pack) drug kit are transferred. After today's installation of the VC12 IELK, SFP Simonyi is now considered a 13S crewmember, and **Expedition 15 has technically begun its residence** aboard ISS. TMA-9 has been docked at ISS since 9/20/06. By the time of its return on 4/20, the spacecraft will have exceeded its nominal 200-day "warranty" life by 12 days. ]*

The CDR-15 will also relocate the three Emergency SODF (Station Operations Data Files) books from the 14S spacecraft into the 13S vehicle and later transfer the new ISS EMER-1 SODF delivered on 14S to the ISS.

Later tonight after the familiarization tour, Charles Simonyi begins his first work on a laptop for email ops and on the IP phone for private conference. Afterwards, as Greg Olsen and Anousheh Ansari before him, he will make the first of his scheduled daily entries in the log/questionnaire for the LBP (Low Back Pain) Muscle experiment.

Yurchikhin is to immediately start work on the PLAZMIDA payload, activating the mobilization process (specimen displacement from one volume to another, plus mixing) and placing the RECOMB-K hybridizer in the KUBIK AMBER thermostat container.

Kotov meanwhile will work in the Soyuz Habitation Module (SO) on the BIOEMULSIYA payload, placing the Bioreactor in the incubator (KT), activated to "culturing mode". Later, Oleg is to activate a mixing process in four stages spaced several hours apart, before the equipment is powered down and secured in the KRIOGEM.

For the SAMPLE experiment (Session 1), Oleg Kotov will provide the first sample, in support of the study of species composition of microorganisms inhabiting the ISS.

FE-2 Sunita Williams is scheduled for the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

On the IMS (Inventory Management System), Suni will update/edit its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

With the new crew increase placing more emphasis on ventilation, Oleg Kotov will check on the function of the important IP-1 airflow sensors in the various Russian segment hatchways, including the SM-to-DC1 (24P) tunnel, and the FGB-to-Node and FGB-to-Soyuz passageways. *[This is a long-term assignment for the crew until the Progress M-60/25P docking in May.]*

Tomorrow morning at ~3:20am EDT, Mike L-A will power up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 3:30am conduct a ham session with students at a Dutch DRS (Delta Researchers Schools) of the Dutch Ministry of Education's DRS program. *[The DRS project is a human spaceflight initiative for Dutch primary schools, with the aim to encourage schools to integrate science and technology into their curriculum using human spaceflight as a theme. The project was set up by the Dutch Ministry of Education, Culture and Science, ESA, and NASA. There are currently 26 primary schools participating in this project. "When you disembark from a boat, it often feels like the earth is moving under your feet. What is the feeling upon returning from space?"; "Would fish in an aquarium in space know that they are weightless?"; "If you fill a balloon with helium and let go of it on the ISS, where would it go?"; "What was your first thought when you travelled into space?"]*

The ISS crew is timelined for their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (CDR, FE-1), and RED resistive exercise device (CDR, FE-2).

No CEO (Crew Earth Observation) photo target requests uplinked today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:39am EDT [= epoch]):

Mean altitude -- 334.3 km

Apogee height -- 345.1 km

Perigee height -- 323.5 km

Period -- 91.22 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0016022

Solar Beta Angle -- 58.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 80 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47992

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:21am) & land (9:36am)

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)

06/01/07 -- Russian EVA-1806/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)

06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)

07/07/07 -- STS-118/13A.1 undocking (NET)

07/12/07 -- STS-118/13A.1 landing (NET)

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch

08/18/07 -- Progress M-61/26P docking (DC1)

08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*

08/26/07 -- STS-120/10A -- Node 2 launch

08/28/07 -- STS-120/10A -- Node 2 docking

09/04/07 -- STS-120/10A undocking

09/07/07 -- STS-120/10A landing

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15 launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing

Late Oct/early Nov -- US EVA-10,-11,-12

11/??/07 -- Progress M-62/27P launch

01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/08/07  
**Date:** Sunday, April 08, 2007 1:33:11 PM  
**Attachments:** [image001.gif](#)

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### **ISS On-Orbit Status 04/08/07**

All ISS systems continue to function nominally, except those noted previously or below. >>>**Happy Easter Sunday, L-A, Misha and Suni!** (Russian Orthodox Easter this year is also today {Orthodox churches celebrate their Easter always on the basis of the Julian calendar and the "paskhalias" – i.e. special "paschal" lunar tables}.) Ahead: Week 29 of Increment 14.

The crew's work/sleep cycle, currently at **11:30am – 3:00am EDT**, will be adjusted twice more: tomorrow (11:30am-4:00am) and on 4/10 (2:00pm – 5:30am EDT) for the 14S docked period. Day 202 in space for L-A and Misha.

**Soyuz TMA-10/14S**, with Expedition 15 crewmembers Fyodor Nikolayevich Yurchikhin (CDR) and "rookie" Oleg Valeriavich Kotov (FE-1) plus American "taxi cosmonaut" Dr. Charles Simonyi, continues to catch up with the station for the **docking tomorrow afternoon at ~3:12pm EDT. (See launch picture below).** [FD1 activities yesterday included the first two maneuver burns, DV1 (5:12pm) & DV2 (6:02pm). FD2 activities, started this morning with Soyuz crew wakeup at ~6:45am on Orbit 12, include systems & crew health status reports to TsUP, preparation of the Soyuz Habitation Module (SA) workspace, building attitude for and executing the DV3 burn at ~2:36pm, placing Soyuz back in its sun-spinning "barbecue" attitude (ISK) and swapping CO<sub>2</sub> absorption cartridges in the BO. On FD3, the crewmembers will put on their Sokol suits and PKO biomed harnesses, transfer to the SA, activate its air purification system (SOA) and close the hatch to the Descent Module (BO). After the DV4 burn, activation of the active Kurs-A system on Soyuz and of the passive Kurs-P on the Service Module (SM), with a short Kurs-A/P test and up to three additional adjustment burns during automated rendezvous, station fly-around to align with the SM aft port will begin at ~400m range, followed by station keeping at ~160m. Final approach will be concluded on Orbit #34 by docking at the FGB nadir port and Soyuz hooks closing at 3:12pm, at

*which time the ISS maneuvers from temporary free drift back to earth-"fixed" LVLH (~3:32pm), reverting to U.S. CMG control at 4:15pm. Yurchikhin and Kotov will replace Expedition 14 CDR Miguel Lopez-Alegria and FE-1 Mikhail Tyurin. FE-2 Sunita Williams remains on the station, joining Expedition 15 until later this year when she will be replaced by US Astronaut Clay Anderson on STS-118. Simonyi will return with the Expedition 14 crewmembers on 4/20 in Soyuz TMA-9/13S (undocking 6:21am; landing 9:36am EDT).]*

Aboard the ISS, FE-1 Mikhail Tyurin observed Orthodox Easter by exchanging Easter greetings via VHF (at ~10:50am) with Patriarch Alexis II of the Russian Orthodox Church who extended best wishes on the occasion of today's celebration. This will be broadcast by Channel Russia and by other networks in programs about Easter and Cosmonautics Day, as well as online. *[His Holiness: "...Not everyone is able to bear the difficult burden of serving the cause of cosmonautics. This is the destiny of courageous, strong-willed people. While staying true to your calling you must stand up to your challenge. Be mindful that you are being watched not only by heavenly bodies and distant galaxies but also by the Great Creator of all, visible and invisible..."]*.

CDR Lopez-Alegria will perform today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

L-A set up the regular ITCS LTL (Internal Thermal Control System/Low Temperature Loop) coolant jumper connection to the LAB1D6 rack in support of ground-commanded activation of the U.S. CDRA (Carbon Dioxide Removal Assembly) scheduled at ~3:40pm EDT (to support the coming increase in station occupancy).

The CDR will also demate the ITCS LTL jumper from the ER1 (EXPRESS Rack 1) in the Lab, after the rack has been deactivated by the ground.

Tyurin is to continue recovery work on the Russian SKV-1 air conditioner, today checking the condensate line (MOK) to the condensate pump (NOK1) whether condensate is flowing from the SKV-1. *[Latest troubleshooting efforts on SKV-1 included flushing the BTA heat exchanger-evaporator wicks with water to ensure they were wet and wicking condensate properly, followed by switching condensate removal to the SBK condensate collector and turning the SKV-1 on for a test yesterday, while powering down the #2 air conditioner, SKV-2. SKV-1 has operated intermittently since the BTA was replaced on 3/1. More repair work is also being considered for the early part of Expedition 15. On SKV-2, a swapover to another telemetry switch has corrected the abnormalities seen two days ago on the SKV-2*

*telemetry downlink, and the unit has returned to nominal ops.]*

The crew is working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), and RED resistive exercise device (CDR, FE-2).

At ~1:30pm, FE-2 Sunita Williams had her weekly PFC (Private Family Conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

Working from his voluntary "time permitting" task list, FE-1 is to conduct the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A second voluntary job for Tyurin is the regular status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G Lada-10 greenhouse payload of barley and pea plants.

Also on Misha's task list for today is another session with the Russian "Diatomeya" ocean observations program, using the SONY HVR-Z1J camcorder to perform a series of nocturnal observations to test digital video registration procedure for bioluminescent glow. *[Uplinked target test zones were the Mediterranean, Black and Azov Seas, and the Atlantic Ocean (Morocco Upwelling, Gulf Stream delta, off-shore area of Great Britain).]*

An additional voluntary job for the FE-1 today: using the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

No CEO (Crew Earth Observation) photo target requests uplinked today.

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
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Eccentricity -- 0.0015855

Solar Beta Angle -- 58.7 deg (magnitude peaking)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 95 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47976

**Significant Events Ahead** (all dates Eastern and subject to change):

04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:12pm)

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:21am) & land (9:36am)

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

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07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch

08/18/07 -- Progress M-61/26P docking (DC1)

08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*

08/26/07 -- STS-120/10A -- Node 2 launch

08/28/07 -- STS-120/10A -- Node 2 docking

09/04/07 -- STS-120/10A undocking

09/07/07 -- STS-120/10A landing

10/01/07 -- Progress M-61/26P undocking (DC1)

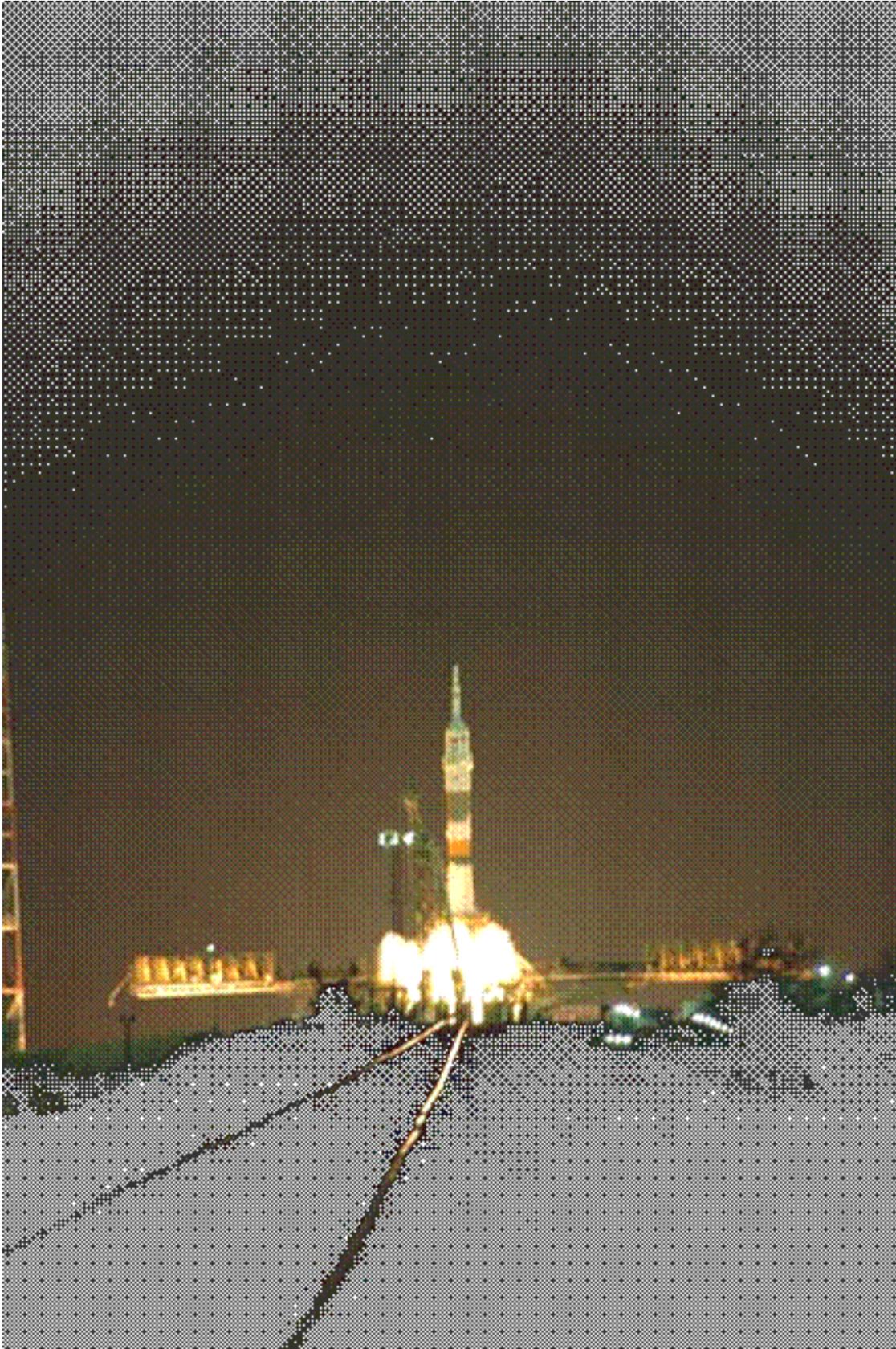
10/02/07 -- Soyuz TMA-11/15 launch

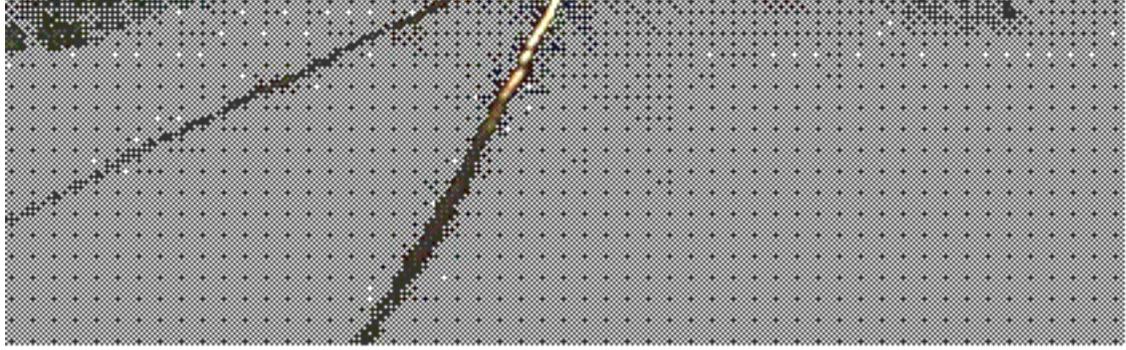
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

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11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

*TMA-10/14S Launch (4-7-07)*





**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)

**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);

**CC:**

**Subject:** ISS On-Orbit Status 04/07/07

**Date:** Saturday, April 07, 2007 3:04:05 PM

**Attachments:**

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**ISS On-Orbit Status 04/07/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams, except for regular maintenance and voluntary work. The crew’s slipped work/sleep cycle, currently at 11:30am – 3:00am EDT, will be adjusted one more time on 4/9 (to 2:00pm – 5:30am EDT) for the Soyuz 14S docked period. Day 201 in space for L-A and Misha!*

**Soyuz TMA-10 (14S) launched on time (1:31:09 pm EDT)** at Baikonur Cosmodrome in Kazakhstan, carrying Expedition 15 crewmembers Dr. Fyodor Nikolayevich Yurchikhin (CDR) and Dr. Oleg Valeriavich Kotov (FE-1) plus American “taxi cosmonaut” Dr. Charles Simonyi, the fifth SFP (Spaceflight Participant) to visit the space station, flying under contract with Space Adventures Ltd. and the Russian Federal Space Agency. The launch was watched by the ISS crew on uplinked TV from Houston, at the time of launch just on the equator over the Central Pacific. 14S achieved orbital insertion after a nominal ascent, and all antennas and solar arrays have deployed. *[Yurchikhin and Kotov will replace Expedition 14 CDR Miguel Lopez-Alegria and FE-1 Mikhail Tyurin. FE-2 Sunita Williams remains on the station, joining Expedition 15 until later this year when she will be replaced by US Astronaut Clay Anderson on STS-118. Simonyi will return with the Expedition 14 crewmembers on 4/20 in Soyuz TMA-9/13S (undocking 6:21am; landing 9:36am EDT).]*

The 14S spacecraft (call sign: “Pulsar 1”) is currently in its first day of catching up with the station for the docking on Monday (4/9) afternoon at ~3:12pm EDT at the FGB nadir port.

For today’s “Saturday Science” program, FE-2 Williams has configured the CFE (Capillary Flow Experiment) equipment in the Lab MWA (Maintenance Work Area), to conduct the second of two ops sessions this weekend as a voluntary task. *[CFE*

*makes use of the station's micro-G environment to investigate the special dynamics of capillary flow, i.e., the interaction of liquid with solid that can draw a fluid up a narrow tube and can be exploited to control fluid orientation so that fluid systems on spacecraft perform predictably. When capillary forces are dominant, as in micro-G, they show static and dynamic multiphase fluid phenomena, primarily through wetting and the system geometry. CFE investigates different fluids and geometries. Sunita today is doing the "Internal Flow 1" test of the CFE suite. The results of CFE will have applications to management of liquid fuels, cryogenics, water-based solutions, and thermal fluids in spacecraft systems. The last CFE session was conducted by Sunita Williams yesterday (4/6). Today's is the ninth run aboard ISS.]*

As his part of "Saturday Science", Lopez-Alegria set up the Holter ECG (Electrocardiogram) Monitor equipment at the HRF1 (Human Research Facility 1) to perform a functional checkout on the digital recorder, which uses seven electrodes to obtain the crewmember's ECG with the HRF1 A31p laptop.

FE1 Tyurin and Sunita Williams will configure and test the TV comm connection from the Russian segment (RS) via A31p laptop in the FGB to the US segment (USOS) for downlink via Ku-band of the Soyuz docking activities.

The crew conducts the regular weekly 3-hr task of thorough station cleaning today. *["Uborka", done routinely on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of today's *uborka*, FE-1 Tyurin takes on the preventive maintenance on the ventilation system in the DC1 (Docking Compartment) by replacing its PF1 & PF2 filters and cleaning the V1 & V2 filter screens plus the VD1 & VD2 air ducts. In the SM, Mikhail will replace the air filters PF1 through PF4.

Tyurin will also be doing more recovery work on the Russian SKV-1 air conditioner. *[Continuing the troubleshooting efforts on SKV-1 started yesterday (where he flushed the BTA heat exchanger-evaporator wicks with water to ensure they were wet and wicking condensate properly), Misha today will switch condensate removal to the SBK condensate collector and turn on SKV-1 for a retest, while powering down SKV-2. More recovery steps are planned for tomorrow if necessary. SKV-1 has operated intermittently since the BTA was replaced on 3/1. More repair work is also being considered for the early part of Expedition 15. On the #2 air conditioner, SKV-2, a swapover to another telemetry switch has corrected*

*the abnormalities seen two days ago on the SKV-2 telemetry downlink. SKV-2 has returned to nominal ops.]*

The CDR will do the daily routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

The crew is working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), and RED resistive exercise device (CDR, FE-2).

Working from his voluntary "time permitting" task list, FE-1 is to conduct the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also on Misha's task list for today is another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets are the natural and technogenic environment of the coastline of Argentina, Buenos Aires, Montevideo, the coast of Australia, plus Patagonian and New Zealand glaciers.]*

An additional voluntary job for the FE-1 today: using the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

At ~1:50pm EDT, the crew had their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

### **Weekly Science Update** (*Expedition Fourteen -- 28<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Nominal.

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BASE*: Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3)*: Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA)*: Complete.

*CBOSS (Cellular Biotechnology Support Systems)*: Complete.

*CFE (Capillary Flow Experiment)*: Planned.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus)*: Nominal video and telemetry continues to be received on the ground..

*CULT (Cultural Factors Questionnaire)*: Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test)*: Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM)*: Complete.

*EPO (Educational Payload Operation)*: The NASA crewmembers were thanked for their participation in the EPO Communications Demo this week. "The EPO team is happy with the results."

*ETD (Eye Tracking Device)*: Complete.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology)*: Planned

*GRAVI (Threshold Acceleration for Gravisensing)*: Complete.

*IMMUNO (Saliva Sampling)*: Complete.

*LEUKIN*: Complete.

*LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System)*:  
"Thanks, Suni, for completing session 1 of the LOCAD-PTS experiment. You did a great job and gave us excellent feedback by voice and video. The instrument functioned successfully. The positive control (your palm) was right where we wanted it to be at 2.4 EU/ml. The negative control was reassuringly negative. Panel NOD1\_0234 was ~0.1 EU, or ~25 times cleaner than the positive control -- pretty clean by office standards (well, compared with Jake's desk anyway). This first session helped us develop a minor change in the procedures for next time that should help remove bubbles from the Dispensing Tip, prior to dispensing into the

sample wells of the LOCAD-PTS Cartridge. This will make droplet volumes more consistent and help avoid negative numbers in some of the readings. Looking forward to session 2!"

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*NOA (Nitric Oxide Analyzer):* Complete.

*NUTRITION:* "Suni, your Increment 15 sessions will be carried in an Inc 15-based Summary".

*PFE-OUM (Periodic Fitness Evaluation - Oxygen Uptake Measurement):* "Suni, your Increment 15 sessions will be carried in an Inc 15-based Summary".

*PK-3 (Plasma Crystal 3):* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G):* Complete.

*RC (Refrigerated Centrifuge):* Planned.

*RS (Renal Stone):* Complete.

*SAMPLE:* Complete.

*SEM (Space Experiment Module):* Complete.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Surface, Water & Air Biocharacterization):* This week L-A and Suni conducted a SWAB surface and air sampling collection. L-A collected air samples and Suni surface samples.

*TRAC (Test of Reaction & Adaptation Capabilities):* Session #6 was performed by Mike LA and Misha on 4/2. It unfolded without problems. Sunita's session #6 will

take place at a later time. "The TRAC team is always happy to work with the crew members and the Marshall team."

*TROPI (Study of Novel Sensory Mechanism in Root Phototropism):* Complete.

*YING (Yeast in No Gravity):* Complete.

*CEO (Crew Earth Observations):* Through 3/31 the ground has received a total of 7,185 of ISS/CEO images for review and cataloging. "You successfully acquired imagery of the Florida Everglades; very good views of Lima, Peru; and two of the Northern Mariana Islands. Your recent unsolicited views of two active volcanoes: the Shiveluch volcano on the Kamchatka Peninsula and Mt. Bagana in the Solomon Islands, provide a double publication coup this week on NASA/GSFC's Earth Observatory website. The former as Image of the Day and the latter as Image of the Day in the Natural Hazards Section. Thanks for your alertness to such opportunities and your excellent imagery of the events!"

No CEO (Crew Earth Observation) photo target requests uplinked today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 11:41am EDT [= epoch]*):

Mean altitude -- 334.4 km

Apogee height -- 345.1 km

Perigee height -- 323.8 km

Period -- 91.22 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0015855

Solar Beta Angle -- 58.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 95 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47963

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:12pm)

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:21am) & land (9:36am)

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking  
TBD -- STS-117/13A undocking  
TBD -- STS-117/13A landing @ KSC  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-1806/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/06/07  
**Date:** Friday, April 06, 2007 2:57:45 PM  
**Attachments:** [image001.gif](#)  
[image002.gif](#)

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### **ISS On-Orbit Status 04/06/07**

All ISS systems continue to function nominally, except those noted previously or below.

The crew's slipped work/sleep cycle, currently at **11:30am – 3:00am EDT**, will be adjusted one more time on 4/9 (to 2:00pm – 5:30am EDT) for the Soyuz 14S docked period.

Before breakfast, FE-2 Williams concluded the third and last day of her 4<sup>th</sup> session with the NASA/JSC experiment NUTRITION with today's first sample collection. Specimen data were scanned with the BCR (Bar Code Reader) and the urine sample then inserted in MELFI (Minus-Eighty Laboratory Freezer for ISS) as the others before. *[The current NUTRITION project expands the previous MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

For CDR Lopez-Alegria, it's time today for his first orthostatic hemodynamic endurance test session with the Russian Chibis suit in preparation for his return to gravity on 4/20, conducting the MedOps MO-4 exercise protocol in the below-the-waist reduced-pressure device (ODNT, US: LBNP/Lower Body Negative Pressure). Mikhail will assist his crewmate as CMO (Crew Medical Officer), and the one-hour session is supported by ground specialist tagup via VHF at ~3:43pm EDT on DO2. *[The Chibis provides gravity-simulating stress to the body's cardiovascular/circulatory system for evaluation of Mike L-A's orthostatic tolerance (e.g., the Gauer-Henry reflex) after 200 days in zero-G. Data output include blood pressure readings.]*

FE-1 Tyurin will also work out in the Chibis suit in his second preliminary 55-min training session (after the first session on 4/2, with L-A assisting).

In the Lab, the CDR is to set up the HRF (Human Research Facility) Ultrasound Lite payload and run a verification check on its TDI (Tissue Doppler Imaging) equipment, after about 1:45-hr warm-up time after activation. Afterwards, the hardware will be deactivated and returned to stowage.

As part of her “Saturday Science” program, FE-2 Williams is preparing to configure CFE (Capillary Flow Experiment) equipment in the Lab MWA (Maintenance Work Area) and conduct the first of two planned ops sessions as a voluntary task (the second to be done tomorrow). *[CFE makes use of the station’s micro-G environment to investigate the special dynamics of capillary flow, i.e., the interaction of liquid with solid that can draw a fluid up a narrow tube and can be exploited to control fluid orientation so that fluid systems on spacecraft perform predictably. When capillary forces are dominant, as in micro-G, they show static and dynamic multiphase fluid phenomena, primarily through wetting and the system geometry. CFE investigates different fluids and geometries. Sunita today is doing the “Vane Gap 2” test of the CFE suite, a study of capillary flow through containers with complex interior corners. The results of CFE will have applications to management of liquid fuels, cryogenics, water-based solutions, and thermal fluids in spacecraft systems. The last CFE session was conducted by Sunita Williams on 3/10. Today’s is the eighth run aboard ISS.]*

In preparation for the ISS-14/ISS-15 joint period, Mikhail Tyurin is scheduled to retrieve two CRYSTALLIZER payload modules from the KRIOGEM-03M cooler in the DC1 Docking Compartment and to place them in transport canisters, ready to be packed for return on TMA-9. Then, the cooler will be prepared for receiving the new BIOEMULSION (BTKh-14) and KONYUGATSIYA (Conjugation, BTKh-10) experiments by having its thermostat set to +4 degC.

In the Soyuz Orbital Compartment (BO), the FE-1 will perform the standard window inspection, using a portable light (SPR) to check the glass surfaces inside the window space for any condensate (fogging).

Lopez-Alegria revised the SODF (Station Operations Data File) Caution & Warning Books with new page updates.

The FE-1 is scheduled to do the periodic (monthly) replacement of the toilet’s urine receptacle (MP) and filter insert (F-V), stowing the old units for disposal. (Last time done: 3/8). Misha will also take care of the daily routine maintenance of the SOZh environmental control & life support systems in the Service Module (SM), as a

voluntary job from his free-time task list.

Continuing the extended leak checking of the spare BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator, Tyurin today is to charge the unit once again with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#21). The last test pressurization was on 3/7. *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

Misha will also conduct the periodic sampling of cabin air for subsequent analysis on the ground, first by using the Russian AK-1M adsorber to sample the air in the SM and FGB, then employing the IPD-CO Draeger tubes sampler to check for CO (carbon monoxide) in the SM.

Air samples will also be taken at several times by L-A and Suni with collection tubes from an air sampling kit (#1002) of the SWAB (Surface, Water & Air Biocharacterization) experiment.

Mike L-A offloaded water from the Lab condensate tank to a CWC (Contingency Water Container) to prepare the collection tank for the increased crew load during the joint six-person period. (See also SKV note below).

The crew is working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1+ODNT), and RED resistive exercise device (CDR, FE-2).

Afterwards, L-A will copy Suni's, Misha's, and his own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Still listed on Tyurin's "time permitting" voluntary task list for today is the periodic picture-taking of the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, photographing the growth of pea and barley seeds in the LADA-10 space greenhouse for monitoring plant growth.

Also from the task list, FE-1 is to conduct the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

An additional voluntary job for Misha is another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets are the natural and technogenic environment of the southern coast of Australia and Tasmania, plus Patagonian and New Zealand glaciers.]*

At ~1:30pm EDT, the crewmembers conducted their regular weekly tagup with the Lead Flight Director at JSC/MCC-H.

Later, at ~4:35pm, Mike L-A is scheduled for a crew discretionary teleconference via S-band/audio.

At ~5:10pm, Misha Tyurin will downlink two PAO TV messages of greetings, one to the International Trade Fair at Hannover/Germany, the other to the citizens of Saratov Oblast in Russia on the occasion of next week's Cosmonauts Day (April 12). *[Denj Kosmonavtov celebrates Yuri Gagarin's pioneering flight into space 46 years ago (as NASA on the same day observes the 26<sup>th</sup> anniversary of STS-1, our first Space Shuttle mission to orbit). Yuri Alexeyevich was accepted into the cosmonaut unit in 1960 at age 26. His historic 108-min. flight around the Earth in "Vostok 1" ended with a parachute ejection at 7 km altitude over a farm field near the city of Engels in Saratov Oblast (province), today site of annual celebration.]*

*Russian SKV-1 and -2 Air Conditioners:* SKV-2 experienced an off-nominal shutdown early yesterday morning. The redundant SKV-1 is still inoperative since its collected condensate is not flowing to the SRVK condensate water processor. Russian specialists are assessing the status of both SKVs to determine a forward plan. Meanwhile, the U.S. Lab and Airlock CCAA (Common Cabin Air Assembly) units remain operating along with IMV (inter-module ventilation) for cabin humidity control.

*Soyuz TMA-10 Status Update:* At Baikonur, Kazakhstan, countdown activities continue like clockwork for tomorrow's launch. The State Commission today approved the prime and backup crews for Soyuz TMA-10 and ISS-15. It also gave the Go to continue the countdown of the Soyuz system for fueling and launch, after GCTC (Gagarin Cosmonaut Test Center) Director Vassiliy V. Tsibliev reported the crews' readiness and RSC-Energia General Designer Nikolai N. Sevastianov certified the readiness of launch vehicle and spacecraft systems (**Photographs below**).

For Simonyi's ride see also

<http://www.charlesinspace.com> and <http://www.spaceadventures.com/index.cfm?>

## [fuseaction=orbital.Mission\\_Updates](#)

Today's CEO (Crew Earth Observation) photo target was **Acraman Impact Crater, Australia** (*weather was predicted to be clear over southern Australia, providing an opportunity to photograph this impact crater. ISS had a near-nadir pass over the 90 km wide, approximately 590 million year old impact structure. The crater is recognized by lakes that mark the center and trace the outer crater rim*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:22am EDT [= epoch]*):

Mean altitude -- 334.6 km

Apogee height -- 345.4 km

Perigee height -- 323.8 km

Period -- 91.22 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0016107

Solar Beta Angle -- 56.8 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 94 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47944

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:12pm)

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:21am) & land (9:36am)

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)

06/01/07 -- Russian EVA-1806/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)

06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)

07/07/07 -- STS-118/13A.1 undocking (NET)

07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
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Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.



**From left: FE-1 Oleg Kotov, N.N. Sevastyanov, CDR Fyodor Yurchikhin, VC12 Dr. Charles Simonyi (4-6-07).**



**Soyuz TMA-10 Prime & Backup Crews (4-6-07)**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/05/07  
**Date:** Thursday, April 05, 2007 1:34:59 PM  
**Attachments:** [image001.gif](#)  
[image002.gif](#)

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### **ISS On-Orbit Status 04/05/07**

All ISS systems continue to function nominally, except those noted previously or below.

The crew's slipped work/sleep cycle, currently at **11:30am – 3:00am EDT**, will be adjusted one more time on 4/9 (to 2:00pm – 5:30am EDT) for the Soyuz 14S docked period.

FE-2 Williams is completing the second day of her 4<sup>th</sup> session with the NASA/JSC experiment NUTRITION, for which she had to forego exercising and food intake for eight hours. During the session, she collects blood samples (assisted by CDR Lopez-Alegria), which are first spun in the RC (Refrigerated Centrifuge) and then placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC will later be powered off after a temperature reset to limit wear on the compressor, and cleaned. Urine samples are also being collected several times during the day and stored in the MELFI.

With Williams having completed her FFQ (Food Frequency Questionnaire), her 15<sup>th</sup>, for NUTRITION, it remains for the CDR to fill out his regular weekly FFQ today on the MEC (Medical Equipment Computer), his 27<sup>th</sup>. The FFQs keep a personalized log of the astronauts' nutritional intake over time on special MEC software. *[Recorded are the amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

After yesterday's ALTEA CNSM (Anomalous Long-Term Effects on Astronauts/ Central Nervous System Monitoring) session by Sunita Williams, Mike Lopez-

Alegria today will cycle and reactivate the ALTEA passive dosimeters.

FE-1 Tyurin is to service the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) by downlinking the accumulated data of its spectrometer from its PCMCIA memory card plus the time of activation of the spectrometer to TsUP/Moscow via OCA. *[ALTCRISS uses the AST spectrometer employed by VC8 guest cosmonaut Roberto Vittori in 2005 in the DC1 for the Italian LAZIO (Low Altitude Zone/Ionization Observatory) experiment.]*

After unstowing the Russian BTKh-11 BIODEGRADATSIYA ("*Biodegradation*") hardware, Tyurin conducted the periodic collecting of surface samples from specific equipment and structures in the station for subsequent stowage in the Soyuz TMA-9 Descent Module for microbial analysis on Earth. The activities were documented with the Nikon D1X digital camera with SB 28DX flash attachment for downlink via OCA.

The FE-1 is scheduled to replace a seal drive handle in the transfer hatch of the pressurized adapter section (GA) of the FGB with a handle taken from the SSVF (docking & internal transfer system) accessory kit of Soyuz TMA-9/13S.

In preparation of the crew's return to Earth, Tyurin will transfer three standard Russian TEK (thermal protection) jackets from the Soyuz TMA-9 Descent Module (backup parachute recess) and to the SM (Service Module) for stowage. *[These warm coats, always ready for an emergency return in winter, will not be required for the landing in Kazakhstan this time of year.]*

Late tonight, Mike L-A and Mikhail will spend an hour on the RSK1 laptop to run a Soyuz descent simulation, a standard training exercise (a full 3-hr training session in the Soyuz Descent Module was conducted by the two crewmembers on 1/23). The exercise on the training simulator will be supported by a tagup and discussions with ground instructors at TsUP/Moscow via S-band.

After FE-1 set up the necessary pump/hose plumbing to the Progress 24P cargo ship and compressed the tank bladder of its BV1 water tank yesterday, FE-2 Williams today will undertake another liquid waste transfer from seven filled EDV-U urine containers to the BV1 tank and then flush the lines with water. *[Each of the Progress' two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before receiving the liquid waste.]*

Mikhail is to perform the periodic collection of air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK*

*tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

On L-A's timeline for today is another periodic atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit).

Batteries are to be replaced if necessary. *[CSA-CP measurements are to be gathered with the new 12A.1 units #1051 (prime) & #1044 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #2007 for CO<sub>2</sub> in SM (panel 449) and Lab, along with battery ticks. The instruments will be turned off afterwards, except for #1051, and returned to their regular locations.]*

In preparation for upcoming renewed activities with the Robotics Onboard Trainer (ROBoT), Mike L-A has an hour on his timeline for setting up the equipment in the Node, in the process deploying a new PS-120 (Power Strip) junction box and two A31p laptops with power supplies. *[ROBoT uses DOUG (Dynamic Operations Ubiquitous Graphics) software, a hand controller and two laptops (one for graphics, one for the simulation) for on-orbit training of MSS (Mobile Service System) and SSRMS (Space Station Remote Manipulator System) operations.]*

Lopez-Alegria will configure the ER1 (EXPRESS Rack 1) later today by connecting its MTL (Moderate Temperature Loop) cooling jumper QDs (quick disconnects) to the nearby LAB1O2 UIP (Utility Interface Panel, "Z-panel"), to prepare for the use of SAMS (Space Acceleration Measuring System) to monitor the 14S arrival at the FGB nadir port.

Later, the CDR is timelined for reviewing demo procedures, setting up camcorder gear and then conducting another EPO (Educational Payload Operations) session, this time the long-planned demo of ISS Communications. *[As always, the video downlinked will be used in future classroom lectures to help demonstrate basic principals of math, science & engineering and inspire our next generation of explorers.]*

Mike L-A will also do the regular bi-weekly maintenance reboot of the SSC (Station Support Computer) File Server and OCA Comm Router laptops as well as the weekly reboot of the PCS (Portable Computer System) A31p laptops.

In addition, L-A is scheduled for the weekly audit/inventory of the available CWCs

(Contingency Water Containers) and their contents, to update the ground's critical tracking of onboard water supplies.

Tyurin is to undertake the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Both the CDR and FE-1 have another hour set aside each for preparations for their departure from the ISS on Soyuz 13S on 4/20, including gathering personal items for return.

Tyurin will also do the daily routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Mike L-A is to update/edit the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew is working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), and RED resistive exercise device (CDR, FE-2).

Afterwards, L-A will copy Suni's, Misha's, and his own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Using the Nikon D1 camera with 17-35 mm lens and flash attachment, Misha Tyurin is to take the periodic images of the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, photographing the growth of pea and barley seeds in the LADA-10 space greenhouse for monitoring plant growth. The regular daily status check is a "time permitting" item on Tyurin's discretionary task list.

Also from the task list, FE-1 is to conduct the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking,*

*carried on the Russian voluntary task list for the duration of Expedition 14.]*

Another voluntary job for Misha is a session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets are the natural and technogenic environment of South Georgia Island, Patagonian and New Zealand glaciers, and natural and technogenic coastal views of the southern coast of Australia.]*

At ~3:45pm EDT, CDR Lopez-Alegria is scheduled for a teleconference with students and faculty at the Naval Postgraduate School (NPS) in Monterey, CA. *[In 1986-88, Navy Captain Lopez-Alegria served on a two-year cooperative program between the NPS and the U.S. Naval Test Pilot School in Patuxent River, Maryland.]*

On the schedule for the entire crew at ~1:25am tomorrow morning is the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

*Soyuz TMA-10 Status Update:* Countdown activities are progressing like clockwork. At 9:00pm EDT last night (5:00am this morning Moscow time) the Soyuz TMA-10/14S was rolled out at Baikonur from the Assembly/Test Facility to the launch pad, and L-2 Day pre-launch operations began on schedule. The launch of the Soyuz-FG launch vehicle with the TMA-10 spacecraft to the ISS is planned for 4/7 at 1:31pm EDT (9:31pm Moscow time). **(Photographs below).**

Today's CEO (Crew Earth Observation) photo targets were **Patagonian Glaciers, S. America** *(cloud cover was predicted to break up over the Patagonian interior, allowing for opportunities to photograph mountain glaciers. Its orbit track brought ISS over the southernmost Patagonian ranges. Weather conditions were optimal on the eastern flanks of the mountains; high resolution imagery of small glaciers near the peaks was requested), and Canberra, Australia* *(ISS has a morning, nadir pass over the capital city of Australia. Nadir mapping along-track was requested to obtain a rural-urban-rural transect across the metropolitan area. Looking for the city in a large valley between generally N-S trending mountain ranges as ISS approached the southeastern coastline of Australia).*

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

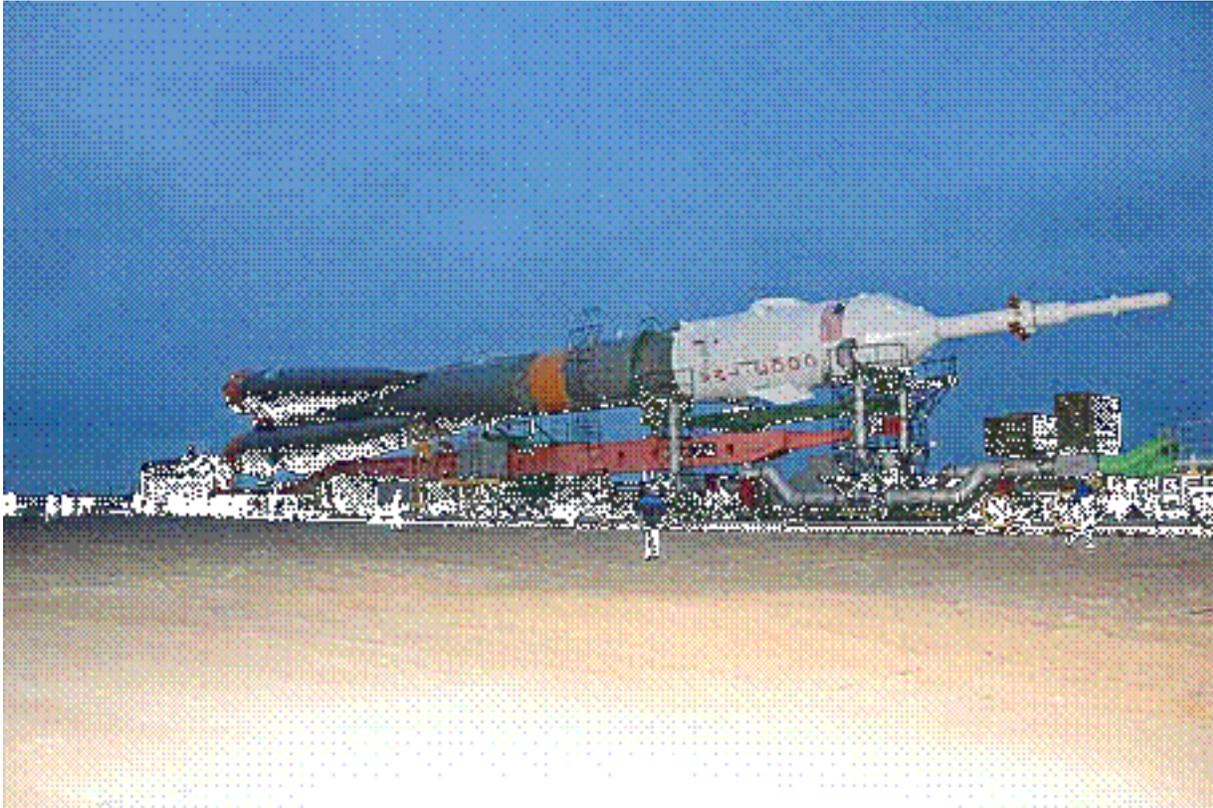
**ISS Orbit** (as of this morning, 6:42am EDT [= epoch]):

Mean altitude -- 334.7 km  
Apogee height -- 345.5 km  
Perigee height -- 323.8 km  
Period -- 91.23 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0016104  
Solar Beta Angle -- 54.6 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 100 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47928

**Significant Events Ahead** (all dates Eastern and subject to change):

04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:12pm)  
04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:21am) & land (9:36am)  
TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)  
TBD -- STS-117/13A docking  
TBD -- STS-117/13A undocking  
TBD -- STS-117/13A landing @ KSC  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-1806/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15 launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.



*Soyuz TMA-10/14S launch vehicle on rail transfer to launch pad (4-4-07).*



*Soyuz TMA-10 on launch pad "Site 1" (4-5-07).*

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 04/04/07  
**Date:** Wednesday, April 04, 2007 2:37:35 PM  
**Attachments:** [image001.gif](#)  
[image002.gif](#)

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### **ISS On-Orbit Status 04/04/07**

All ISS systems continue to function nominally, except those noted previously or below.

The crew's slipped work/sleep cycle, currently at **11:30am – 3:00am EDT**, will be adjusted one more time on 4/9 (to 2:00pm – 5:30am EDT) for the Soyuz 14S docked period.

FE-1 Mikhail Tyurin completed his first session of the 24-hour of ECG (electrocardiogram) recording under the Russian MedOps MO-2 protocol. *[For the ECG recording, the FE-1 yesterday donned the five-electrode Holter harness that read his dynamic (in motion) heart function from two leads over 24 hours and recorded data on the Kardioregistrator 90205 unit. CDR Lopez-Alegria was available to assist in the harness donning and doffing.]*

It was Mike L-A's turn today for the second part of the PHS assessment, with blood labs, assisted by FE-2 Williams (who was the subject yesterday) in using the U.S. PCBA (portable clinical blood analyzer). The third part of the PHS, Subjective Clinical Evaluation, will be performed later in the day. *[The PHS exam, with PCBA analysis and clinical evaluation, is guided by special software (IFEP, in-flight examination program) on the Medical Equipment Computer (MEC). While PCBA analyzes total blood composition, the blood's hematocrit is particularly measured by the Russian MO-10 protocol.]*

In preparation for the arrival of VC12 (Visiting Crewmember #12) Charles Simonyi, FE-1 Tyurin set up the Service Module (SM) work area for Simonyi's planned experiments during his 12-day stay on the station. *[Prepping the work area with the pre-delivered equipment is vital for the success of VC12 by reducing the SFP (Spaceflight Participant)'s time spent on his program. For the VC12 experiment PLASMIDA (BIO-8), Tyurin also set up the ESA temperature-controlled incubator*

*chamber KUBIK AMBER, for BTKh-14/BIOEMULSION & BIOCONT-T the KRIOGEM-03 cooler, for MATRITSA ("Matrix") Sony & Nikon photo/video equipment, and he also "ghosted" the RSE1 laptop with special software for running the experiments and storing VC12 photo images.]*

In the Lab's P2 rack, Drawer 1, FE-2 Williams turned on the ICU (Interface Control Unit) of the SAMS (Space Acceleration Measurement System).

Later, Sunita will tear down the IWIS (Internal Wireless Instrumentation System) hardware that was used for taking structural dynamics data during the Soyuz relocation.

After setting up the necessary pump/hose plumbing, Tyurin will prepare for liquid waste transfer to the BV1 water tank of the Progress 24P cargo ship-turned-trash can by compressing the tank bladder to expel any left-over contents and test for hermeticity. Tomorrow, Mikhail is scheduled to transfer urine from seven filled EDV-U liquid waste containers to the BV1 tank, then flush the line with water. *[Each of the Progress' two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before receiving the liquid waste.]*

FE-2 Williams is to conduct her routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected.

Then, after Williams and Mike L-A have recycled the ALTEA dosimeters, deleted old data files from the CNSM (Central Nervous System Monitoring) laptop and set up the video equipment, L-A and Suni will configure the CNSM brain electrode helmet gear for another session, this time with L-A the subject and Sunita the operator. *[Background: ALTEA measures details about cosmic radiation and its interactions with Astronauts' central nervous system. This involves CNS measurements with a 32-channel EEG (electroencephalograph) of the crewmember, plus accurate long-term real-time particle flux dosimetry (DOSI mode) inside the ISS with six particle detectors (originally introduced on Mir). A specific focus of CNSM is on abnormal visual perceptions (such as the often reported phosphenes, - "light flashes", with eyes closed) and the impact of particles on brain functions in micro-G. For comparison, brain stimulation is also done with "known" optical signals (with eyes open). Subjects record their perceptions with a pushbutton device. ALTEA equipment can be used separately or in any combination, permitting several different experiments: in physics, dosimetry, psychophysics, electrophysiology and cognitive neurophysiology. The NASA-*

*sponsored ALTEA-CNSM, developed by the Italian Space Agency (ASI) and the Italian firm Alenia Spazio, is assigned to Increments 13, 14 and 15. Its predecessor ALTEINO was performed on ISS in April 2002 by Roberto Vittori during his Soyuz taxi mission.]*

Later tonight, Sunita has ~1.5 hrs scheduled to do the periodic thorough inspection of the ELPS (Emergency Lighting Power Supply) units in the U.S. segment. The FE-2 will also verify that the Node Forward and Lab Forward EELS (Emergency Egress Lighting Strips) have the correct pattern for guiding contingency egress to the Shuttle Orbiter (pieces of gray tape attached to the EELS to create a dotted pattern). *[There are three ELPS units in the Node, two in the Lab, and one ELPS in the US Airlock.]*

Suni Williams is also timelined to unstow and set up the hardware for the urine collection part of her next session with the NUTRITION experiment. *[The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts, collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples (plus an additional postflight sample), made possible by the MELFI/Minus Eighty Degree Celsius Laboratory Freezer for ISS].*

L-A and Mikhail have another hour each set aside for preparations for their departure from the ISS on Soyuz TMA-9/13S on 4/20, including gathering personal items for return. The FE-1 will use a newly uplinked stowage list of equipment to be returned on 13S which includes commemorative items for Charles Simony (e.g., a package of earth from Simonyi's country of origin, Hungary). Later tonight, Misha will review the necessary stowage layout in the Soyuz Descent Module and tag up via S-band with Soyuz stowage specialists.

Tyurin will also do the daily routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

FE-2 Williams is to update/edit the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew is working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), and RED resistive exercise device (CDR, FE-2).

Afterwards, Suni will copy L-A's, Misha's, and her own exercise data file to the MEC

for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~12:45pm EDT, the station residents held the periodic teleconference with the Expedition 15 crew via S-band.

At ~6:35pm, Williams will set up the SM's ham radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, power supply) and at 6:40pm engage in questions & answers with students of Glenden State School, Glenden, Queensland/Australia, via the ARISS amateur radio service. Glenden State School is a Prep (Preschool)-to-Grade 12 Campus, situated about 180km from the nearest populated centre, Mackay, in the state of Queensland, in north-eastern Australia. The school and town were purpose-built, on what was formerly grazing land, to service the Newlands Coal Mine. At present, the school has 230 students and 16 teaching staff. [*“What made you want to have such a fun but risky job?”; “What preparation is needed before beginning your mission on the International Space Station?”; “How many years did it take to get trained to become an astronaut?”; “Can you have a pet rabbit in the Space Station?”; “What are the biggest dangers you face in space?”; “What happens to your blood in space?”*]

Working off his discretionary “time permitting” task list, the FE-1 conducted the regular status check on the long-term BIO-5 Rasteniya-2 (“Plants-2”) micro-G Lada-10 greenhouse payload of barley and pea plants.

Also from the task list, Tyurin is to conduct the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). [*This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.*]

Another voluntary job for Mikhail is a session with the Russian “Uragan” (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. [*Today’s Uragan photo targets Patagonian and New Zealand glaciers.*]

*VTR1 Update:* During yesterday’s troubleshooting by the FE-2 of the #1 video tape recorder (VTR-1), it was found that the machine’s playback image is degraded whenever special bypass cables (primarily for routing Shuttle video down through the ISS VTRs) are used. When the cables are disconnected the VTR playback image is stable. Additional analyses along with a determination for manifesting replacement cables are ongoing.

*Soyuz TMA-10 Status Update:* At Baikonur, the TMA-10/14S Soyuz payload assembly was moved to the Launch Vehicle Integration & Checkout Facility yesterday. Today, its mating with the Soyuz-FG launch vehicle was completed (**see photographs below**). All pre-countdown activities are on schedule. The 14S crew is at Baikonur. Also, a technical management meeting was held today, chaired by President & Designer General of S.P. Korolev RSC-Energia N.N. Sevastiyarov and the State Commission. It was decided to proceed with the roll-out to the launch pad of the launch vehicle with the Soyuz TMA-10 spacecraft.

Today's CEO (Crew Earth Observation) photo target was **Jarvis Island, equatorial Pacific** (*ISS had a near-nadir pass over Jarvis Island. The ecosystem health of reefs near the island is of interest, and high resolution imagery is useful for mapping their current extent. Variable clouds were present in the area, but there may have been cloud-free "windows" available to capture imagery of the island. Looking slightly left of track for the island*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:43am EDT [= epoch]*):

Mean altitude -- 334.7 km  
Apogee height -- 345.5 km  
Perigee height -- 324.0 km  
Period -- 91.23 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0016023  
Solar Beta Angle -- 51.7 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 124 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47913

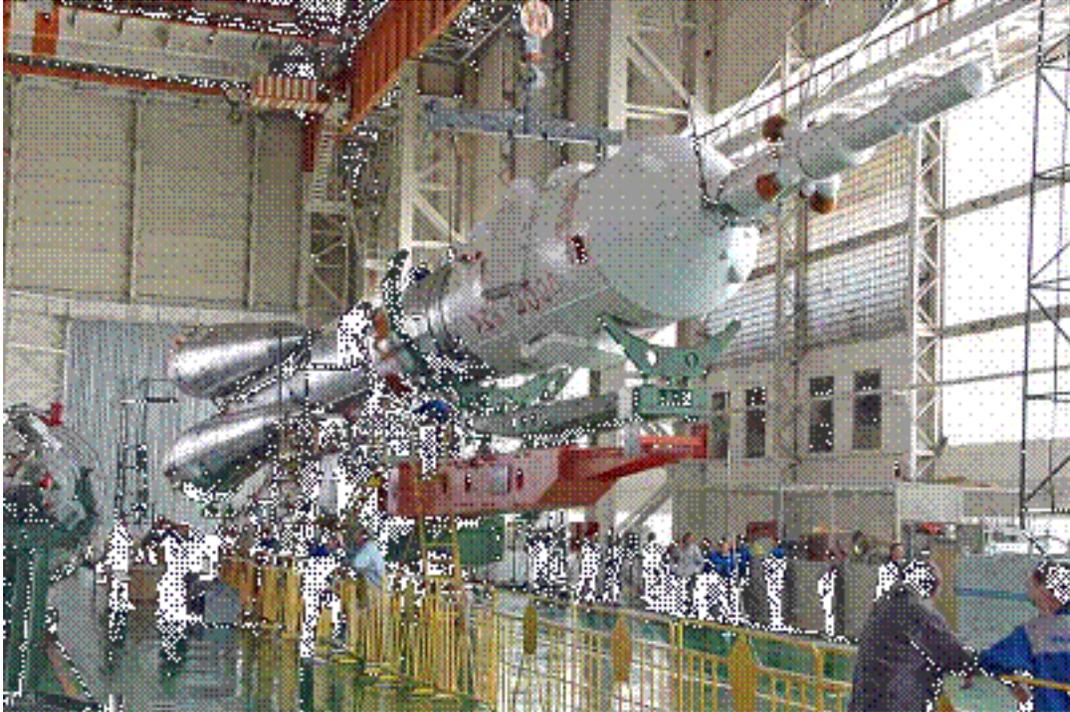
**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:12pm)  
04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:21am) & land (9:36am)  
TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)  
TBD -- STS-117/13A docking  
TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-1806/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.



*Soyuz TMA-10/14S spacecraft w/shroud being mated to Soyuz FG second stage.*



*Soyuz FG launch vehicle assembled with payload (4-4-07).*

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/03/07  
**Date:** Tuesday, April 03, 2007 1:59:26 PM  
**Attachments:**

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**ISS On-Orbit Status 04/03/07**

All ISS systems continue to function nominally, except those noted previously or below. >>>Starting today, CDR Lopez-Alegria is setting a new U.S. single spaceflight endurance record, having passed the 196-day mark set five years ago. At the time of his return on Soyuz TMA-9, L-A will have achieved 214 days.<<<

The crew's slipped work/sleep cycle, currently at **11:30am – 3:00am EDT**, will be adjusted one more time on 4/9, to 2:00pm – 5:30am EDT, for the Soyuz 14S docked period.

The three station residents began their workday, before breakfast & first exercise, by completing another session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. [MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]

The two NASA astronauts then did the second part of the PHS assessment, with blood labs, taking turns in assisting each other in using the U.S. PCBA (portable clinical blood analyzer). The third part of the PHS, Subjective Clinical Evaluation by each crewmember, will be performed later in the day. Afterwards, FE-2 Williams completes data entry for both of them and stows the hardware. [The PHS exam, with PCBA analysis, MO-10, and clinical evaluation, is guided by special software (IFEP, in-flight examination program) on the medical equipment computer (MEC). While PCBA analyzes total blood composition, MO-10 particularly measures the blood's hematocrit.]

FE-1 Tyurin is conducting his first session of the Russian MedOps MO-2 protocol which calls for 24-hour recording of his ECG (electrocardiogram). *[For the ECG recording, Mikhail donned the five-electrode Holter harness that read his dynamic (in motion) heart function from two leads over 24 hours and record data on the Kardioregistrator 90205 unit. CDR Lopez-Alegria assisted his crewmate in the harness donning (and tomorrow's doffing).]*

Later tonight, Tyurin will perform maintenance work on the Service Module (SM) light system, replacing its lighting switchboard (ShchO-ShO) with the panel removed from Progress M-58/23P on 3/26. The activity will be supported by ground specialist tagup.

The FE-1 is to run another internal pressure check on the spare BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator, to check for hermeticity. The unit was charged by him on 3/7 with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#21). *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

FE-2 Williams has an hour reserved for troubleshooting the #1 video tape recorder (VTR-1).

Sunita is also scheduled for a teleconference with ground specialists to discuss the downlinked imagery of her 30-min. skill training on 3/28 of the RPM (Rbar Pitch Maneuver) photo shoot. *[Prior to docking, the 360-degree RPM will allow a photographic survey of the Orbiter with the ISS DCS cameras from ~600 ft distance, using 400 & 800mm focal length lenses to focus on tile acreage and door seals. Time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

Tyurin will perform an inventory/audit of old items of individual space suit & protection gear (SIZ) stowed in two bags in the FGB. *[The equipment includes dust collector filters, toilet paper, toilet inserts, a MAKITA drill charger, and a scopemeter.]*

Williams will do the daily routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

It's Mike L-A's job today to update/edit the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases

on the ground (Houston, Moscow, Baikonur).

L-A and Misha have another hour each set aside for preparations for their departure from the ISS on Soyuz TMA-9/23P on 4/20 by gathering personal items for return.

Sunita is scheduled to do the standard weekly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), checking the condition of the roller bearings and record its time & date values.

The crew is working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), and RED resistive exercise device (CDR, FE-2).

Afterwards, L-A will copy Suni's, Misha's, and his own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

In preparation for the arrival of VC12 (Visiting Crewmember #12) Dr. Charles Simonyi, arriving next week (4/9) in Soyuz 14, the three ISS crewmembers today are scheduled to conduct a thorough review of the VC12 mission program. Later tonight (~12:30am), the crew is to conduct a tagup with ground specialists to discuss VC12 program/ops. *[Dr. Simonyi's program during his 12-day stay (4/9-4/20) includes the experiments MATRITSA-Z1, PILLE-MKS, SAMPLE (ESA) and MUSCL (ESA); three live ISS RS-TsUP/Moscow teleconference hookups; six amateur radio sessions; taking interior photo & video imagery aboard the ISS RS, commemorative activities, performing Earth imagery, working with the SIGMA ballistic navigational software (BNO), using IP telephone & e-mail (daily) via US communications assets, and conducting private medical conferences & discussions with Simonyi's consultative group (via Russian communications assets). Russian experiment during the VC12 mission will include KONYUGAYTSIYA, BIOEMULSIYA, REGENERATSIYA, PLAZMIDA, PNEVMOKARD, PILOT, and PLASMA-MKS.]*

At ~4:05pm EDT, Misha, L-A and Suni will downlink two messages of greetings, one for Roskosmos on the occasion of its Cosmonautics Day (April 12) gala meeting at the Central Academic Theater of the Russian Army on April 12, the other an address to the participants and guests of the International Trade Fair ("Hannover Messe") at Hannover, Germany, on April 16-20, to be played at the exhibition stand of Gazprom (whose affiliate Gazcom is implementing two new satellite projects: two Yamal-300 comsats plus the Space Surveillance & Cartography System SMOTR).

A new item added to the U.S. "job jar" task list for Suni is to take media photography of the new, potentially revolutionary LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System) experiment.

Working off his discretionary task list, Tyurin is to conduct the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Another voluntary job for Mikhail is a session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets Patagonian and New Zealand glaciers.]*

A new list of five suggested activities for the voluntary "Saturday Science" program was uplinked for Suni's and L-A's choice, to be made by tonight. *[The choices are two CFEs (Capillary Flow Experiments), one or more EPO (Educational Payload Operations) demos of "Sports", "Newton's Laws", or "Hobbies", a Holter Monitor Checkout for CCISS (Cardiovascular & Cerebrovascular Control on Return from ISS), and Ultrasound with TDI (Tissue Doppler Imaging) Option Update.]*

Today's CEO (Crew Earth Observation) photo targets were **Nairobi, Kenya** (*ISS had an early morning pass over the Nairobi metropolitan area. A nadir mapping swath along-track maximized the crew's potential to capture this target. Contrast between the urban and surrounding rural areas is poor, however*), and **Mt. Kilimanjaro, Kenya** (*this early morning mapping pass should provide the crew with near-nadir views of this famous volcano. Researchers are particularly interested in imagery of the summit glaciers, to record changes in snow cover and ice extent. A mapping pass along-track is suggested*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:33am EDT [= epoch]*):

Mean altitude -- 334.9 km

Apogee height – 345.5 km

Perigee height -- 324.3 km

Period -- 91.23 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0015823  
Solar Beta Angle -- 48.2 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 130 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47897

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:12pm)  
04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:21am) & land (9:36am)  
TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)  
TBD -- STS-117/13A docking  
TBD -- STS-117/13A undocking  
TBD -- STS-117/13A landing @ KSC  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-1806/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) -- *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/02/07  
**Date:** Monday, April 02, 2007 4:19:42 PM  
**Attachments:**

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**ISS On-Orbit Status 04/02/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 28 of Increment 14. Current crew work/sleep cycle (slipped for Soyuz 14S docking) 11:30am – 3:00am EDT.*

After the recent preparations for uncrewed station operation during Soyuz 13S relocation, FE-1 Mikhail Tyurin today re-established access to the Progress M-59/24P cargo ship at the DC1 Docking Compartment. *[Re-integration activities included 24P/DC1 vestibule leak check, opening of transfer hatches, installing the QR (quick release) screw clamps to rigidize the docking joint, turning off 24P systems, installing air ducts for ventilation, and conducting closeout ops.]*

The three crewmembers undertook another run, their sixth, with the NASA-sponsored German/Canadian experiment TRAC (Test of Reaction & Adaptation Capabilities). CDR Lopez-Alegria set up the video gear and assembled the TRAC hardware in the work area (i.e., laptop, joystick, headphones, and time box). Afterwards, Sunita, Mikhail and L-A performed their individual data take sessions. Later, the CDR closed out and stowed the equipment. (Done last: 3/23), *[TRAC tests the idea that the decrease in motor skills reported by some astronauts (for example, hand-eye coordination), is due to the brain adapting to being in space. By testing hand/eye coordination of crewmembers, scientists hope to test the theory that while the brain is adapting its sensory-motor functions to space it is unable to fully provide the resources necessary to perform normal manual skills, i.e., the data will be used to show that adaptation to zero-G draws on resources normally used for computational tasks, for example. Crewmembers test their hand-eye coordination prior to the mission, while on orbit and then again when they have returned to Earth. TRAC hardware includes a laptop mounted to a table and a joystick to control the cursor on the PC screen. Also used are audio headphones and a reaction time box to respond to audio and visual stimuli. For the test the crewmember is sitting on the floor of the Lab module, with legs restrained and the*

*work table on the legs.]*

FE-1 Tyurin performed the first preliminary 55-min training session in the "Chibis" ODNT suit as part of his preparations for returning into gravity. A tagup with ground specialists via VHF supported the run at a 3:59pm EDT pass, and Lopez-Alegria provided assistance. *[The below-the-waist reduced-pressure device ODNT (US: LBNP), part of the "Chibis" garment, provides gravity-simulating stress to the body's cardiovascular/circulatory system for reestablishing the body's orthostatic tolerance (e.g., the Gauer-Henry reflex) after the six-month stay in zero-G.]*

Afterwards, the FE-1 unstowed and set up the equipment for another scheduled "Urolux" biochemical urine test (PZE MO-9), scheduled tomorrow. *[MO-9 is conducted regularly every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for US crewmembers for IMG (Integrated Medical Group) PHS evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. The data are then entered in the Medical Equipment Computer (MEC)'s special IFEP software (In-Flight Examination Program).]*

Sunita Williams unstowed and set up the hardware for the general US MedOps PFE (periodic fitness evaluation) with blood lab, also scheduled tomorrow. *[This is a monthly 1.5-hr. procedure which checks up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (cycle ergometer with vibration isolation) in the Lab. Readings will be taken with the BP/ECG (blood pressure/electrocardiograph) and the HRM (heart rate monitor) watch with its radio transmitter, with Mike L-A assisting Williams. BP/ECG provides automated noninvasive systolic and diastolic blood pressure measurements while also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise.]*

Later today, after hooking up the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable at the RWS (Robotics Work Station) for video coverage, Sunita will break out and install the OUM-PFE (Oxygen Uptake Measurement - Periodic Fitness Evaluation) equipment at the HRF-2 (Human Research Facility 2) rack. Then, with Mike L-A acting as OUM-PFE operator, Suni will go through the evaluation protocol, obtaining measurements on herself. *[The operations will be documented with photo and video. Later, Suni updates the evaluation protocol, deactivates & stores the gear, including photo/video equipment, and powers down the OUM-PFE laptop.]*

The CDR is to work on the station's email system to verify that the email accounts of the next crew and SFP Simonyi are working properly.

Later, L-A will also audit and consolidate the accessory kit of the TVIS treadmill, transferring its contents into a 1.0 CTB (Cargo Transfer Bag) for more efficient stowage.

Mikhail Tyurin is scheduled to continue troubleshooting the Russian SKV-1 air conditioner, to restore its condensate collection & transfer capability.

The FE-2 meanwhile will conduct an inventory/audit of the Russian SVO water supply system and afterwards collect potable water samples from the SVO-ZV tap in Russian drink bags for return to Earth.

Mike L-A and Mikhail again have time reserved for making preparations for their departure from the ISS on Soyuz TMA-9 on 4/20 by gathering and prepacking equipment, including personal items, for return. This activity extends over the next weeks.

L-A also will collect hardware for stowage in PMA2 (Pressurized Mating Adapter 2).

Suni is timed to download the structural dynamics data gathered by the IWIS RSUs (Internal Wireless Instrumentation System/Remote Sensor Units) in the SM (Service Module), FGB and Node during the Soyuz relocation. *[Earlier, these three RSUs did not download successfully due to the hatches being closed during Soyuz relocate (not enough RF strength). The Lab RSU data did download successfully last week.]*

Williams will also do the daily routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Later, the FE-2 is to update/edit the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew will work out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1+ODNT, FE-2), and RED resistive exercise device (CDR, FE-2).

Afterwards, Suni will copy L-A's, Misha's, and her own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six

times a week).

At ~7:35pm EST, the CDR is to set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 7:40pm conduct a ham session with students at St Michael's Primary School, Daceyville, NSW, Australia. *[St Michael's Primary School Daceyville is situated in the Eastern Suburbs of Sydney. It is a Catholic Systemic Primary School that serves the immediate community of Daceyville; with a number of students attending from outlying areas.*

*The school has a population of 161 students ranging from Kindergarten (5 years old) to Year 6 (11 years old). "Do you suffer from travel or motion sickness when you're an astronaut? Does it cause you much discomfort? How do you cope with being sick in space?"; "How do you wash and go to the toilet in space without making a big mess?"; "Can you please explain what it feels like to be weightless?"; "Do you believe there is life in outer space without any evidence?"]*

At 12:00 midnight EDT, the crew is scheduled for a teleconference with the ISS-15 crew.

An item added to the U.S. "job jar" task list for L-A and Suni is to inspect/audit lower launch restraints of pivotable racks in the Lab, Node and Airlock. *[This was caused by the unexpected discovery of the lower launch restraints (LLRs) engaged during the recent rotation of the LAB1P6 rack for the ISL (Integrated Station LAN) cabling installation. The LLRs were supposed to have been released during the 5A mission. They are required to be disengaged for quick access to the pressure shell in a contingency situation. L-A and Suni are to disengage any LLRs they might discover.]*

Working off his discretionary "time permitting" task list, the FE-1 conducted the regular status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G Lada-10 greenhouse payload of barley and pea plants.

The second item on the Russian task list for Tyurin is the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Another voluntary job for Mikhail is a session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets are the alluvial plain of the Nile River, Patagonian glaciers and New Zealand glaciers.]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (*all dates Eastern and subject to change*):

- 04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)
- 04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:03pm)
- 04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:11am) & land (9:30am)
- TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)
- TBD -- STS-117/13A docking
- TBD -- STS-117/13A undocking
- TBD -- STS-117/13A landing @ KSC
- 05/12/07 -- Progress M-60/25P launch
- 05/14/07 -- Progress M-60/25P docking (SM aft port)
- 06/01/07 -- Russian EVA-18
- 06/07/07 -- Russian EVA-19
- 06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)
- 06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)
- 07/07/07 -- STS-118/13A.1 undocking (NET)
- 07/12/07 -- STS-118/13A.1 landing (NET)
- 07/13/07 -- FGB solar array retraction
- 07/20/07 -- Progress M-60/25P undocking & reentry
- 07/24/07 -- US EVA-9
- 08/02/07 -- PMA-3 relocation
- 08/15/07 -- Progress M-59/24P undocking (DC1) & reentry
- 08/16/07 -- Progress M-61/26P launch
- 08/18/07 -- Progress M-61/26P docking (DC1)
- 08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*
- 08/26/07 -- STS-120/10A -- Node 2 launch
- 08/28/07 -- STS-120/10A – Node 2 docking
- 09/04/07 -- STS-120/10A undocking
- 09/07/07 -- STS-120/10A landing
- 10/01/07 -- Progress M-61/26P undocking (DC1)
- 10/02/07 -- Soyuz TMA-11/15S launch
- 10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)
- 10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing

Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 04/01/07  
**Date:** Sunday, April 01, 2007 1:06:04 PM  
**Attachments:**

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### **ISS On-Orbit Status 04/01/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 14 (CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin, FE-2 Sunita Williams). Ahead: Week 28 of Increment 14. Current slipped crew work/sleep cycle: 11:30am – 3:00am EDT.*

Mikhail Tyurin completed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

The FE-1 has several more items waiting for his discretion on his "time permitting" discretionary task list, leading off with the regular status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G Lada-10 greenhouse payload of barley and pea plants.

The second item on the Russian "job jar" discretionary task list for Tyurin is the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Another voluntary job for Mikhail is a session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets are Patagonian glaciers and the volcanoes of New Zealand.]*

Additionally from the "if time permits" suggestions, Misha is to perform another session of the Russian "Diatomeya" ocean observations program, using the Sony

HVR-Z1J camcorder (medium zoom) to obtain oceanological data for bioluminescent glow high production zones in World oceans during orbital sunset. *[Targets were in the Indian Ocean coastal waters of Madagascar and the Hindustan peninsular region, in the Atlantic Ocean waters of the South Atlantic Ridge (SAR) axis and the Gulf of Guinea, the Mediterranean Sea, and the Black Sea.]*

As a fifth discretionary "free time" job, the FE-1 will conduct the periodic check of the Mosfet (metal oxide semiconductor field-effect transistor) radiation dosimeter reader/display of the MATRYOSHKKA-R payload in the DC1 Docking Compartment. *[The reader automatically records radiation readings at strictly defined times (:00, :15, :30, :45 minutes). The complex Matryoshka payload suite is designed for sophisticated radiation studies. The payload collects radiation measurements every 15 minutes of each hour around the clock. Note: Matryoshka is the name for the traditional Russian set of nested dolls.]*

The crew will work out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), and RED resistive exercise device (CDR, FE-2).

Mike L-A and Suni will have their weekly PFCs (Private Family Conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop), L-A at ~1:10pm EDT, Suni at ~5:25pm.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 11:29am EDT [= epoch]):

Mean altitude -- 335.1 km

Apogee height -- 345.5 km

Perigee height -- 324.8 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0015453

Solar Beta Angle -- 40.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 120 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47868

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)  
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06/07/07 -- Russian EVA-19  
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06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
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08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
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08/26/07 -- STS-120/10A -- Node 2 launch  
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Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/25/07  
**Date:** Saturday, March 31, 2007 1:00:13 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/25/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 14 (CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin, FE-2 Sunita Williams). Current crew work/sleep cycle: 8:00am – 11:30pm EDT (until 3/28) Ahead: Week 27 of Increment 14.*

CDR Lopez-Alegria supported his current SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) experiment by accessing the SLEEP software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]*

Sunita Williams completed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

The FE-2 also disconnected the regular ITCS LTL (Internal Thermal Control System/ Low Temperature Loop) coolant jumper connection to the LAB1D6 rack in support of ground-commanded deactivation of the U.S. CDRA (Carbon Dioxide Removal Assembly) at ~8-12am EDT. *[CDRA operation yesterday supported the SPHERES experiment.]*

Working off his Russian "job jar" discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

Also from the “time permitting” job list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A third suggestion for Misha’s choice was another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the SONY PD-150P camcorder to record color bloom patterns in the ocean, highly pronounced cloud cover anomalies, swirls, wakes of subsurface waves, water level drop, smoothing lanes in wave fields. *[Uplinked target zones were in the Atlantic Ocean the western section of the Sargasso Sea, the Estuary part of the Amazon, and the convergence zone of the Falkland and Brazil currents, and in the Pacific Ocean the waters of the California and Peru currents.]*

All crewmembers worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Mike L-A and Suni Williams are both scheduled for their weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop), L-A at 12:10am, Suni at 1:45pm.

*“SATURDAY SCIENCE” Update:* Flight Control to L-A and Suni: “The SPHERES team would like to thank you for your great execution of SPHERES. The SPHERES scientists are ecstatic with the results. The “Lost in Space” scenarios were an amazing success. This data will be used to support three more theses in addition to the four theses from last week”.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:37am EDT [= epoch]):

Mean altitude -- 336.2 km

Apogee height – 346.3 km

Perigee height -- 326.0 km  
Period -- 91.26 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.00151  
Solar Beta Angle -- 6.8 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 210 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47755

**Significant Events Ahead** (*all dates Eastern and subject to change*):

03/27/07 -- Progress M-58/23P undocking (from SM aft port, 2:11pm) & reentry (7:19pm)  
03/29/07 -- Soyuz TMA-9/13S relocation #2 (FGB nadir port to SM aft port, 6:28pm–6:53pm)  
04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:03pm)  
04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:11am) & land (9:30am)  
TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)  
TBD -- STS-117/13A docking  
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TBD -- STS-117/13A landing @ KSC  
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06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
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Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/31/07  
**Date:** Saturday, March 31, 2007 12:58:39 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 03/31/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams, except for regular maintenance and voluntary work. Current slipped crew work/sleep cycle: 11:30am – 3:00am EDT.*

The crew conducted the regular weekly 3-hr task of thorough station cleaning. [*"Uborka", done routinely on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.*]

As part of today's *uborka*, FE-1 Tyurin takes on the preventive maintenance on the ventilation system in the FGB (*Funktsionalnyi-Grusovoi Blok*) by cleaning the detachable VT7 fan screens of the SOTR (Thermal Control System)'s gas-liquid heat exchangers (GZhT4).

CDR Lopez-Alegria will conduct the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

FE-2 Williams has three hours voluntary time dedicated to performing the first session with the LOCAD-PTS (Lab-on-a-Chip Application Development-Portable Test System) experiment. After reviewing uplinked experiment procedures, Williams will tag up with the ground team, then set up the experiment for sampling and take five different samples (1-5) plus a potable water sample. Afterwards, Suni will close out the payload. [*LOCAD-PTS is a hand-held device that is used to*

*provide rapid detection of microbial and chemical contamination on surfaces. Astronauts will swab surfaces within the cabin, add swab material to the LOCAD-PTS, and within 15 minutes obtain results on a display screen. The study's purpose is to effectively provide an early warning system to enable crew members to take remedial measures if necessary to protect the health and safety of those on board the station. The current study should prepare for long-duration exploration by demonstrating a system that enables the crew to perform biochemical analysis in space without returning samples to Earth.]*

In the DC1 Docking Compartment, Mikhail Tyurin is scheduled to conduct a leak check on the shutoff valve in the sublimator feed line of the Orlan 27 spacesuit.

Afterwards, the FE-1 will restore DC1 and SM communications to nominal settings, after the relocation configurations.

The crew will work out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), and RED resistive exercise device (CDR, FE-2).

Afterwards, Suni will copy L-A's, Misha's, and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his Russian "job jar" discretionary task list, Tyurin is to perform the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also off the voluntary job list, Tyurin conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were volcanoes of New Zealand plus the natural and technogenic coastal environment of southern coast of Australia and Tasmania.]*

An additional voluntary job for Misha today: using the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

## **Weekly Science Update** (*Expedition Fourteen -- 27<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Photos and data downlinked on 3/15 show nominal performance and configuration for ALTCRISS.

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BASE:* Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA):* Complete.

*CBOSS (Cellular Biotechnology Support Systems):* Complete.

*CFE (Capillary Flow Experiment):* Planned.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* In progress.

*CULT (Cultural Factors Questionnaire):* Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test):* Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* Complete.

*EPO (Educational Payload Operation):* Complete.

*ETD (Eye Tracking Device):* Complete.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology):* Planned

*GRAVI (Threshold Acceleration for Gravisensing):* Complete.

*IMMUNO (Saliva Sampling):* Complete.

*LEUKIN:* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*NOA (Nitric Oxide Analyzer):* Complete.

*NUTRITION:* Planned.

*PFE-OUM (Periodic Fitness Evaluation - Oxygen Uptake Measurement):* Planned for FE-2.

*PK-3 (Plasma Crystal 3):* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G):* Complete.

*RC (Refrigerated Centrifuge):* Planned.

*RS (Renal Stone):* Complete.

*SAMPLE:* Complete.

*SEM (Space Experiment Module):* Complete.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* Planned.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Next week L-A and Suni will both be scheduled to conduct a SWAB surface and air sampling collection. L-A will collect air samples, and, Suni surface samples.

*TRAC (Test of Reaction & Adaptation Capabilities):* On 3/23, another successful TRAC session took place for the 3 crew members. Video was recorded for part of the time (due to LOS/Loss of Signal) but what ground researchers saw "reflected the scientific requirements for TRAC. Thanks to the crew for their generosity".

*TROPI (Study of Novel Sensory Mechanism in Root Phototropism):* Complete.

*YING (Yeast in No Gravity):* Complete.

*CEO (Crew Earth Observations):* Through 3/27 the ground has received a total of 6,885 of ISS/CEO images for review and cataloging. That includes over 2,000 frames in the month of March alone. "Thank you for your successful acquisition of the Sudbury/Wanapitei Impact Site. You acquired five good 180mm views of these features in snow and ice, the best we have to date. We are now reviewing and evaluating imagery you acquired to the Florida Everglades and Pilcomayo River targets. Your strikingly detailed view of Montevideo, Uruguay acquired with the 800mm lens in late January will be posted on NASA/GSFC's Earth Observatory website this weekend. The image demonstrates how the resolution of such imagery is adequate for urban study and planning purposes".

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:21am EDT [= epoch]*):

Mean altitude -- 335.3 km

Apogee height -- 345.9 km

Perigee height -- 324.6 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0015838

Solar Beta Angle -- 35.8 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 140 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47849

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04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:03pm)

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:11am) & land (9:30am)

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TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

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06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
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09/04/07 -- STS-120/10A undocking  
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Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/30/07  
**Date:** Friday, March 30, 2007 12:52:37 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 03/30/07**

All ISS systems continue to function nominally, except those noted previously or below. *A short workday, with slipped sleep cycle: Wakeup 3:00pm, sleeptime 1:30am.*

**Soyuz TMA-9 (13S) relocation went smoothly.** After a brief ride in their crew return vehicle, CDR Michael Lopez-Alegria (left seat), FE-1 Mikhail Tyurin (center) and FE-2 Sunita Williams (right) docked at the Service Module (SM) aft port on time, completing the spacecraft's relocation from the FGB nadir port. After the relocation and station ingress, the crew went to sleep at ~5:00am this morning.

Wakeup will be this afternoon at ~3:00pm EDT. Afterwards, finishing the clean-up after the relocation, FE-2 Williams will spend some time on returning U.S. items from the Russian Segment (RS) to the U.S. Segment (USOS). *[This includes the A31p PCS (Portable Computer System) laptop which had temporarily joined the A31p permanently located in the FGB.]*

CDR Lopez-Alegria will deactivate the IWIS (Internal Wireless Instrumentation System) which took structural dynamics data of the relocation in the RS.

The CDR also is to conduct the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

FE-1 Tyurin is scheduled to perform another internal pressure check on the spare BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator, to check for hermeticity. The

unit was charged by him on 3/7 with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#21). *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

Afterwards, Tyurin will work on reactivating the Elektron-VM oxygen (O<sub>2</sub>) generator with the usual preceding nitrogen (N<sub>2</sub>) purge of the BZh-9 Liquid Unit and ground specialist tagup. *[The CDR is scheduled to assist by monitoring the external temperature of the secondary purification unit (BD) for the first 10 minutes of operation to ensure that there is no overheating. During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Mikhail is also to perform the periodic collection of air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

On Mike L-A's timeline for today is another periodic atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit).

Batteries are to be replaced if necessary. *[CSA-CP measurements are to be gathered with the new 12A.1 units #1051 (prime) & #1044 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #2007 for CO<sub>2</sub> in SM (panel 449) and Lab, along with battery ticks. The instruments will be turned off afterwards, except for #1051, and returned to their regular locations.]*

L-A and Sunita will fill out their regular weekly FFQs (Food Frequency Questionnaires) on the MEC (Medical Equipment Computer), his 25<sup>th</sup> and Suni's 14<sup>th</sup>, which keep a personalized log of their nutritional intake over time on special MEC software. *[The FFQ records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Misha Tyurin is to use the Nikon D1 camera with 17-35 mm lens and flash

attachment to take the periodic images of the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, photographing the growth of pea and barley seeds in the LADA-10 space greenhouse for monitoring plant growth. A picture of Misha working on the payload is also desired but discretionary. The regular daily status check is a "time permitting" item on Tyurin's task list.

The crew will work out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni will copy L-A's, Misha's, and her own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

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An additional item suggested for Misha's voluntary choice today was another run of the Russian GFI-8 "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were central mountain regions of Taiwan, a series of isolated valleys and New Zealand volcanoes.]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/29/07  
**Date:** Thursday, March 29, 2007 3:30:14 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/29/07**

All ISS systems continue to function nominally, except those noted previously or below. *Today the crew has a long workday: Wakeup 8:00am, sleeptime 5:00am.*

Preparing the USOS (US segment) for decrewing, FE-2 Williams configured the ECLSS (Environment Control & Life Support System) and ITCS (Internal Thermal Control System), to be ready in the eventuality of a failed redocking of the crew. *[The ER1 (EXPRESS Rack 1) is powered off. After installation of jumpers (fluid hoses) for the racks by Williams, the ground transitioned the TCS to Dual-Loop Mode, and the LTL (Low Temperature Loop) set point was raised, in order to provide redundancy in the USOS for critical avionics, for the unlikely event that a leak in one of the loops causes that loop to shut down, and to minimize the impacts of a depressurization.]*

Meanwhile, CDR Lopez-Alegria configured the USOS OpsLAN (Operations Local Area Network), including the two situation-monitoring Sony videocams in the USOS.

Afterwards, at ~11:00am EDT, Mike L-A closed the Lab & Node hatches, isolating the USOS from the Russian segment (RS).

After starting final preparations in the RS, FE-1 Mikhail Tyurin was joined by the CDR and FE-2 to complete systems reconfigurations for decrewing, including -

- Deactivation of
  - SOTR thermal control system,
  - Vozdukh CO<sub>2</sub> removal system (~11:15am)
  - ASU toilet system,
  - SKV air conditioner,
  - SRVK-2M water processing/supply system,
  - SOP food supply system,

- PILLE radiation sensor system
- SOTR thermal control system (~11:20am)
- FGB air ventilation fans
- PSS Caution & Warning System in SM and FGB
- PPS System Power Panel in the SM
- DSD Pressure Alarm Sensor,
- Laptops & other plugged equipment,
- TVIS treadmill, followed by
- Closing external shutters on SM windows (#6, 8, 12, 13, 14),
- Deactivation of DC1 Docking Compartment,
- Deactivation of SM ventilation system,
- Dismantling air ducts between DC1 & SM and in the FGB,
- Disconnecting the VD1 & VD2 air duct filters in the FGB,
- Removing the GA-PGO hatch frame ring in the FGB
- Closing the hatches between FGB and PMA-3 (Pressurized Mating Adapter 3, ~11:30am)
- Removing the RO-PrK hatch frame ring in the SM/DC1 vestibule,
- Powering down SM fans.

Hatches were closed at ~1:30pm between the FGB/SM, at ~1:55pm between DC1/SM. *[During the relocation, both PCS (Portable Computer System) laptops in the FGB and the PSS Caution & Warning (C&W) panels in all Russian modules are powered off prior to ingressing the Soyuz. Thus, there was a period of time without C&W audio annunciators in the RS and without an active PCS. Deactivation of ham radio in FGB: ~1:15pm, of the FGB PCS: ~1:20pm.]*

RS thrusters will be disabled at ~4:10pm. Then, QD (quick disconnect) screw clamps will be removed at the FGB transfer tunnel, followed by Soyuz TMA-9 ingress at ~2:20pm, cleaning of hatch seals and one hour leak checking. *[Thrusters re-enabled at 4:30pm.]*

While locked out in TMA-9, L-A, Suni and Misha are wearing their Sokol spacesuits, conduct Soyuz checkout operations including Kazbek seat fit check, and have their lunch break.

For the relocation, ISS attitude control authority will be handed over to RS motion control at 5:25pm. After relocation, control returns to US momentum management at ~7:50pm.

After the relocation, opening of hatches to the SM is expected to start at ~9:45pm after the usual one-hour leak check, to the USOS (Node, Lab, Airlock) at ~12:20am and to the DC1 at ~1:25am. Station OpsLAN restoration should be accomplished by ~1:30am tomorrow morning

TMA-9 deactivation begins at about 11:25pm. After reconfiguring station comm to nominal mode, the crew will reactivate all station systems that had been switched to autonomous (unmanned) configuration. *[Backout (reverse order) activation, generally requiring the crew only for monitoring, involves the PPS power system, PSS C&W panels in SM, FGB and DC1, DSD pressure alarm sensor, Central Post BVS computer/control systems (Wiener laptop, printer, InPU displays), ventilation systems and air ducts in SM, DC1 and FGB, SM ASU toilet facilities, time clock, Vozdukh CO2 scrubber, SKV air conditioner, SRVK-2M condensate water supply system & processor, SOTR thermal control system, SOP food systems, STTS onboard communications links, Pille radiation dosimeters, TVIS treadmill, etc.]*

As part of RS post-docking activities, the crew will also set up their Sokol spacesuits and gloves for drying, followed by their stowage.

Before turning in tomorrow at ~5:00am, the crew will have their dinner (~3:00am).

Due to the crowded timeline, requiring meticulous attention to detail, there were no physical exercise sessions scheduled for the crew.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 7:26am EDT [= epoch]):*

Mean altitude -- 335.6 km

Apogee height -- 345.9 km

Perigee height -- 325.3 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0015333

Solar Beta Angle -- 16.8 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 150 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47818

**Significant Events Ahead** *(all dates Eastern and subject to change):*

03/29/07 -- Soyuz TMA-9/13S relocation #2 (FGB nadir port to SM aft port, 6:28pm--

6:53pm)

04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:03pm)  
04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:11am) &  
land (9:30am)  
TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)  
TBD -- STS-117/13A docking  
TBD -- STS-117/13A undocking  
TBD -- STS-117/13A landing @ KSC  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 03/28/07  
**Date:** Wednesday, March 28, 2007 12:46:04 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/28/07**

All ISS systems continue to function nominally, except those noted previously or below. *Current crew work/sleep cycle: 8:00am – 11:30pm EDT.*

In preparation for the Soyuz TMA-9/13S relocation tomorrow, the crew completed final close-out activities on Progress M-59/24P, to enable its potential contingency separation by TsUP in the crew's absence. *[FE-1 Tyurin first activated necessary vehicle systems on 24P, then dismantled the air duct in the hatchway between Progress and the DC1 Docking Compartment. Next, Misha and Mike L-A removed the threaded quick-disconnect (QD) screw clamps of the SSVP docking & internal transfer system in the hatchway between Progress and DC1, which rigidize the mating surfaces. The interface was visually inspected and videotaped to ensure that there is no damage to the cords, snap hooks or rings on the latches and to the slots for the clamps in the SSVP's internal flanges. Finally, Tyurin closed the hatches between Progress and DC1, followed by depressurization of the DC1-to-Progress vestibule for the mandatory one-hour leak checking. RS (Russian segment) thrusters, which had been inhibited prior to the QD clamps removal, were then re-enabled. After the relocation, all the aforementioned steps will be reversed, to restore accessibility and connectivity of the Progress, which is to remain docked for another five weeks.]*

Because the ISS remains unoccupied during relocation, it is being configured for unmanned ops. *[During the brief flight of 13S with the station crew, all hatches in the ISS will be closed and systems configured to assure unmanned survivability even in the unlikely event of unsuccessful redocking. A number of items needed to be transferred, by FE-2 Williams, to the FGB to be available after crew ingress; from the USOS (U.S. segment), this involved an A31p PCS (Portable Computer System) laptop, specific hardcopy ODF (Operations Data File) procedures books, CCPK (Crew Contamination Protection Kit), AMPs (Ambulatory Medical Packs) and ALSPPs (Advanced Life Support Packs).*

Suni's preparations for the unoccupied period included powering up the SVG (Space Video Gateway) for downlinking video.

Mike L-A and Mikhail had another hour each to make preparations for their departure from the ISS on Soyuz TMA-9/23P on 4/20 by gathering personal items for return. This activity will extend over the next weeks.

Tyurin tore down and stowed the GFI-1 Relaksatsiya ("relaxation") experiment hardware used yesterday for observing the Progress reentry burn and the Earth's limb for the geophysical spatiotemporal study of the radiation spectrum from the atmosphere and surface.

Mikhail also took the periodic (generally monthly) health test with the cardiological experiment PZEh MO-1 "Study of the Bioelectric Activity of the Heart at Rest" on the TVIS (Treadmill with Vibration Isolation System), assisted by Lopez-Alegria. *[During the 30-min. test, the crew tagged up with ground specialists on Russian ground site (RGS) passes via VHF and downlinked data from the Gamma-1M ECG (electrocardiograph) for about 5-6 minutes.]*

Sunita Williams completed a 30-min. skill training/rehearsal of the RPM (Rbar Pitch Maneuver) documentation scheduled for the arrival of STS-117/Atlantis on Flight Day 3, to hone her photo skills. Afterwards, she downlinked the images obtained during the test shootings. *[Prior to docking, the 360-degree RPM will allow a photographic survey of the Orbiter with the ISS DCS cameras from ~600 ft distance, using 400 & 800mm focal length lenses to focus on tile acreage and door seals. Time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

FE-2 Williams set up an ITCS LTL (Internal Thermal Control System/Low Temperature Loop) coolant jumper connection to the LAB1D6 rack to prepare the CDRA (Carbon Dioxide Removal Assembly) for activation by the ground.

Afterwards, Sunita configured the IWIS (Internal Wireless Instrumentation System) equipment, programming its software for measuring structural dynamics data during tomorrow's relocation.

After her recent IFM (inflight maintenance) on the RED (Resistive Exercise Device), Williams today performed the standard Flexpac canister load calibration as required after cable replacements. (Last time done: 3/5/07). *[The on-orbit calibration of the Schwinn RED cans re-establishes the relationship of specific load settings with a specific number of pulls per setting, followed by recording of the load values measured with a calibration tool and steel handles from the on-orbit calibration kit.]*

Mike L-A is to attend to the standard weekly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), checking the condition of the roller bearings and record its time & date values.

The CDR will also complete today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Lopez-Alegria is scheduled for the weekly audit/inventory of the available CWCs and their contents, to keep track of onboard water supplies.

All crewmembers are working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2, CDR), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni will copy L-A's, Misha's, and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his Russian "job jar" discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse, and topping off the water tank if ~20-25% of the total amount (4 liters) remains.

Also from the "time permitting" job list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

**ISS Orbit** (as of this morning, 7:04am EDT [= epoch]):

Mean altitude -- 335.7 km

Apogee height -- 346.1 km

Perigee height -- 325.4 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0015394

Solar Beta Angle -- 21.7 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 130 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47802

**Significant Events Ahead** (*all dates Eastern and subject to change*):

03/29/07 -- Soyuz TMA-9/13S relocation #2 (FGB nadir port to SM aft port, 6:28pm–6:53pm)

04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:03pm)

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:11am) & land (9:30am)

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)

06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)

07/07/07 -- STS-118/13A.1 undocking (NET)

07/12/07 -- STS-118/13A.1 landing (NET)

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch

08/18/07 -- Progress M-61/26P docking (DC1)

08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*

08/26/07 -- STS-120/10A -- Node 2 launch

08/28/07 -- STS-120/10A – Node 2 docking

09/04/07 -- STS-120/10A undocking

09/07/07 -- STS-120/10A landing

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing

Late Oct/early Nov -- US EVA-10,-11,-12

11/??/07 -- Progress M-62/27P launch

01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/27/07  
**Date:** Tuesday, March 27, 2007 4:05:03 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/27/07**

All ISS systems continue to function nominally, except those noted previously or below. *Current crew work/sleep cycle: 8:00am – 11:30pm EDT.*

Progress M-58/23P undocking took place successfully on schedule at 2:11pm EDT.

To observe the Progress reentry burn and the Earth's limb for the geophysical spatiotemporal study of the radiation spectrum from the atmosphere and surface, Tyurin is setting up the GFI-1 Relaksatsiya ("relaxation") experiment by configuring the Russian payload laptop 3 for the experiment and mounting the ultraviolet (UV) camera with spectrometer unit at SM window #9, with its cover open. *[Purpose of the session is spectrometric recording of the Earth limb, the 23P propulsion system plume (by UV-video) during the 5-min. reentry burn at 6:44pm along with the emission layer of the atmosphere at the Earth's limb during that period, and the actual reentry of the Progress at ~7:19pm. Tomorrow, the FE-1 will tear down the experiment and stow the equipment.]*

CDR Lopez-Alegria and FE-1 Tyurin spent about 3 hrs on a drill/training session for the Soyuz relocation on 3/29, supported by uplinked material and ground specialist tagup.

FE-1 Mikhail Tyurin serviced the Russian Harmful Impurities Removal System (BMP), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The bake-out will be terminated at ~11:15pm EDT. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

The FE-1 performed another internal pressure check on the newly delivered BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator, to check for hermeticity. The unit

was charged by him on 3/7 with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#21). *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

FE-2 Williams conducted the periodic CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout on the prime unit (#1051) and backup unit (#1044). *[Sunita changed out the prime unit's battery, then zero-calibrated both instruments. Following zero calibration, the backup unit was stowed, while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

After the CDR prepared the auditory test equipment, each crewmember took the periodic (monthly) on-orbit hearing assessment (O-OHA) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC (Medical Equipment Computer) laptop application. It was L-A's sixth, Misha's fifth, and Suni's fourth session. *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month. Note: There have been temporary hearing deficits documented on some U.S. and Russian crewmembers, all of which recovered to pre-mission levels.]*

After Mike L-A configured the camcorder for today's EPO (Educational Payload Operation) program, he and Suni performed the scheduled IPY (International Polar Year) demo. *[IPY involves synchronized observations of PMCs (Polar Mesospheric Clouds), Aurorae, and other large-scale polar phenomena from the ISS and ground sites. ISS crewmembers will make observations of bi-polar phenomena in concert with scientists at polar-based ground sites. Space-based observations, on the length scale of half a continent, will augment ground-based measurements.]*

*Background: For more than 40 years astronauts have been observing Earth, taking photographs or digital images from spacecraft. Today, a robust program of observation from the ISS has yielded hundreds of thousands of images of the Earth's surface collected since 2001. Because the ISS has an orbital inclination of 51.6 degrees, high latitude observations are common. Some of the most striking images collected include views of polar phenomena. Astronauts routinely pass*

*above brilliant red and green aurora, view high, wispy clouds at the top of the atmosphere, or look down on glaciers and floating ice rafts. These images are easily interpreted by students and teachers. Astronaut observations provide a way to visualize complicated polar phenomena and communicate about them to students of all ages. Over the next two years, station crews will formally focus their observations on polar phenomena as participants in the IPY (International Polar Year). Their imagery will be coordinated with other IPY scientists staging studies and field campaigns on the ground. The imagery will be cataloged and posted on NASA's web-based database of images, allowing investigators, students and teachers to search through the imagery, assemble image datasets, and download the imagery and the metadata.]*

After setting up the camcorder equipment, Williams was to downlink a SAFER (Simplified Aid for EVA Rescue) checkout video via Ku- & S-band.

All crewmembers are working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni will copy L-A's, Misha's, and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The FE-2 is to conduct today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Later, L-A will update/edit the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The CDR is scheduled to log on to the "SoyuzTaxi1" account and verifying its email capability for the "taxi" crewmember, SFP Charles Simony (see <http://www.charlesinspace.com>). *[The ground uplinked a test email to this account, to which L-A's "reply" will provide a good roundtrip checkout for the 14S mission.]*

Mike L-A and Mikhail had another hour each to make preparations for their departure from the ISS on Soyuz TMA-9/23P on 4/20 by gathering personal items for return. This activity will extend over the next weeks.

Mike L-A disconnected the ER1 (EXPRESS Rack 1) from the MTL (Moderate Temperature Loop) cooling jumper QDs (quick disconnects) to the nearby LAB1O2 UIP (Utility Interface Panel, "Z-panel").

Working off his Russian "job jar" discretionary task list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

An additional item suggested for Misha's voluntary choice today was another run of the Russian GFI-8 "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were Patagonian glaciers, the Far East coast, and New Zealand volcanoes.]*

At ~9:05am, Mike L-A held a discretionary crew TV PAO conversation with the Mayor of the Spanish city of Badajos via Ku- & S-band.

At ~9:40am EDT, Suni set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 9:45am conducted a ham session with students at International School of Brussels, Brussels, Belgium. *["How do you use the bathroom in space?"; "Is every day interesting on the Space Station or do you get bored?"; "How long have you been on the space station and how long will you expect to stay?"; "When you come back to earth, will it be hard to readjust to gravity?"; "Is this your first trip into space?"; "Do you believe that sending people to Mars is beneficial?"; "How many people are on the space station and do you ever disagree with one another?"; "How do you wash yourself? Is there a shower?"]*

At ~3:25pm, Sunita Williams conducted a PAO exchange with Satellite Radio via Ku- & S-band.

Today's CEO (Crew Earth Observation) photo targets were **Vista Alegre Impact Crater** (*this was the crew's first impact site of this pass and centered at 25.95S 52.68W. It is only 9.5-km in diameter and about 65 million years old. ISS approach was from the NW over broad Rio Parana River Valley. The Rio Iguacu in southern Brazil joins the Parana from the E in a distinctly dark forest preserve area. As ISS reached the Iguacu, the crew was to begin a continuous, overlapping mapping strip and continue southeastward through the next site just seconds later*), and **Vargeao Dome Impact Crater** (*continuing the nadir mapping pass through this impact site centered at 26.83S 52.12W. It is just 12-km in diameter and about 70 million years*

old.)

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
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Perigee height -- 325.8 km

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Eccentricity -- 0.0015069

Solar Beta Angle -- 16.8 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 130 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47786

**Significant Events Ahead** (*all dates Eastern and subject to change*):

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04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:03pm)

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:11am) & land (9:30am)

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)

06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)

07/07/07 -- STS-118/13A.1 undocking (NET)

07/12/07 -- STS-118/13A.1 landing (NET)

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/26/07  
**Date:** Monday, March 26, 2007 1:13:14 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/26/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 27 of Increment 14.*

FE-1 Mikhail Tyurin performed the periodic regeneration of the Russian Harmful Impurities Removal System (BMP) by starting the "bake-out" cycle to vacuum on absorbent bed #1 of the dual-channel filtration system. The bake-out will be terminated at ~10:15pm EDT. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

In preparation for the Soyuz TMA-9 (13S) relocation #2 on 3/29, Flight Engineer Mikhail Tyurin is to support a ground-commanded checkout of the Soyuz motion control system (SUD, Mode 2/"Docked") which includes pressurization of the Combined Propulsion System (KDU) section 2 and tank 2, a test of the pilot's translational hand controller (RUD), and a hot firing of the DPO braking thrusters. KDU maneuver thrusters will not be fired. *[For the test, station attitude will be handed over to Russian thruster control at 7:30pm EDT, commanded to free drift, then back to LVLH +XVV (Local Vertical Local Horizontal/x-axis in velocity vector) attitude. The one-minute firing starts at ~8:00pm. Attitude control will later (8:45pm) be returned to the U.S. segment (USOS).]*

Before breakfast, CDR Lopez-Alegria, FE-1 Tyurin & FE-2 Williams performed the Russian biomedical routine assessments of PZeh-MO-7/Calf Volume Measurement and PZeh-MO-8/Body Mass Measurement (7<sup>th</sup> time for Suni, 13<sup>th</sup> time for L-A and Mikhail), using the IM mass measurement device which Misha afterwards broke down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G,*

*where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

To continue preparations for tomorrow's undocking of Progress M-58/23P, the crew dismantled and removed the remaining electronic equipment from the cargo ship, to be recycled. TsUP/Moscow, via RGS (Russian ground site), was then ready to initiate charging of the Progress' primary and reserve batteries, as required. *[After last week's removal of the US-21 matching unit, FE-1 Tyurin today took out the cargo ship's LKT local temperature sensor commutator (TA251MB) of the BITS2-12 and its PZU-1M ROM (read-only memory) unit, also the SD1-7M light fixture (if both lights were operating, otherwise it was to be discarded) and their ShchO-ShO lighting switch panel. When a Progress is undocked and jettisoned, the valuable electronics are retained, to be recycled on a future vehicle.]*

Afterwards, Tyurin activates the cargo ship and dismantles the air duct in the hatchway of the SM PrK aft dock. During the subsequent removal of the threaded quick-disconnect (QD) screw clamps of the SM docking & internal transfer system (SSVP), which have rigidized the mating surfaces, followed by closure of the hatches between 23P and transfer tunnel (~4:35pm), and the standard one-hour vestibule leak check (4:55pm-5:55pm) to verify hermeticity, the ground is restricting thruster firings by the Russian segment (RS), should they be required.

In the U.S. Airlock, the CDR is scheduled for troubleshooting the EACP (EVA/EMU Audio Control Panel), using the MultiMeter volt/amp instrument. *[The troubleshooting should determine if the failure of the ATU-4 unit to enter and remain in VOX mode when used with the EACP EMU 1 switch is due to a change in the internal resistance across the switch contacts. If the resistance is high, cleaning the switch contacts by cycling the switch should be attempted.]*

The FE-2 continues her support of EMCS (European Modular Cultivation System) payload operation by setting its switches to the On position and powering up the EXPRESS Rack 3 (ER3) laptop. Later in the day, the laptop will be turned off again.

Mike L-A and Mikhail began preparations for their departure from the ISS on Soyuz TMA-9/23P on 4/20 by gathering personal items for return. This activity will extend over the next weeks.

To monitor structural dynamics during tomorrow's 23P undocking, Williams is to set up and activate the IWIS (Internal Wireless Instrumentation System). *[The data*

*take is part of SDTO (Station Development Test Objective) "Structural Life Validation & Extension". The task was previously scheduled for the 13A Stage but was accelerated due to the Shuttle launch slip.]*

Sunita Williams configured the CFE (Capillary Flow Experiment) equipment in the Lab MWA (Maintenance Work Area) and performed the experiment, which took about 2 hrs. Afterwards, the hardware was torn down and stowed. *[CFE makes use of the station's micro-G environment to investigate the special dynamics of capillary flow, i.e., the interaction of liquid with solid that can draw a fluid up a narrow tube and can be exploited to control fluid orientation so that fluid systems on spacecraft perform predictably. Suni today did the "CFE Vane Gap 1" test of the CFE suite, a study of capillary flow through containers with complex interior corners. Today's tests will provide detailed information on the equilibrium fluid condition and on the fluid's sensitivities to small asymmetries in the container. The results of CFE will have applications to management of liquid fuels, cryogenics, water-based solutions, and thermal fluids in spacecraft systems. The last CFE session was conducted by FE-2 Sunita Williams on 3/10. Today's was the eighth run aboard ISS.]*

Suni prepared for tomorrow's EPO IPY (Educational Payload Operation/ International Polar Year) demo session by reviewing uplinked background material.

All crewmembers are working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copies L-A's, Misha's, and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At 4:55pm, the crew is scheduled for the periodic science/research conference with the ISS Program Scientist and colleagues. *[Points of discussion will pertain to the planned science program for the remaining Increment 14 and Increment 15. Experiments to be finished through end of I-14 are ALTEA (4 of 6 runs done), TRAC (L-A 5 runs are done), SLEEP, and SWAB (pre-13S), plus upgrades for future use for MSG (refurb, ready for a suite of experiments), and EXPRESS software (allowing more ground control). Suni (who is to remain into I-15) will finish NUTRITION (at Day 180), TRAC (last 6<sup>th</sup> run before return), SLEEP, PMDIS (set up for 13A & 13A.1 crews), and taking samples out of MELFI prior to her return on 13A.1. Extra Science, to fill in for the 13A slip, will be SPHERES, SWAB (prior to reach vehicle docking), CFE, EPO, LOCAD (starting in April), and EMCH (after*

April).]

Sunita Williams is to complete today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

At 9:20am & 2:05pm, L-A and Suni were scheduled for two crew discretionary conference

Working off his Russian "job jar" discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse, and topping off the water tank if ~20-25% of the total amount (4 liters) remains.

An additional item suggested for Misha's voluntary choice today was another run of the Russian GFI-8 "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were the volcano Yaskaran in northern Peru and New Zealand volcanoes.]*

Also from the "time permitting" job list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 11:07am EDT [= epoch]):

Mean altitude -- 336.0 km

Apogee height -- 346.2 km

Perigee height -- 325.8 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.001523

Solar Beta Angle -- 11.8 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 150 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47773

**Significant Events Ahead** (*all dates Eastern and subject to change*):

03/27/07 -- Progress M-58/23P undocking (from SM aft port, 2:11pm) & reentry (7:19pm)  
03/29/07 -- Soyuz TMA-9/13S relocation #2 (FGB nadir port to SM aft port, 6:28pm–6:53pm)  
04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:03pm)  
04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:11am) & land (9:30am)  
TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)  
TBD -- STS-117/13A docking  
TBD -- STS-117/13A undocking  
TBD -- STS-117/13A landing @ KSC  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12

11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/24/07  
**Date:** Saturday, March 24, 2007 11:33:55 AM  
**Attachments:**

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**ISS On-Orbit Status 03/24/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams, except for regular maintenance and voluntary work. Current crew work/sleep cycle: 8:00am – 11:30pm EDT (until 3/28).*

All ISS systems continue to function nominally, except those noted previously or below.

CDR Lopez-Alegria supported his current SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) experiment by accessing the SLEEP software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR's sleep/wake patterns and light exposure, he is wearing a special Activwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]*

The crew conducted the regular weekly 3-hr task of thorough station cleaning. *[“Uborka”, done routinely on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, FE-1 Tyurin performed preventive maintenance cleaning on the FGB ventilation system.

For today's voluntary “Saturday Science” program, Mike L-A and Sunita are setting up the hardware and are conducting another test series (Session 7) of autonomous operations & multi-body formation flying of free-flying satellites within the cabin of ISS, as part of the SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites) investigation, today working for the first time with three SPHERES satellites simulating “Lost in Space” scenarios. *[SPHERES demonstrates the basics of formation flight and autonomous docking, using beacons as reference for the satellites, to fly formation with or dock to the beacon. A number of programs define various incremental tests including attitude control (at different rotation rates), attitude-only tracking, attitude and range tracking, docking with handheld and mounted beacons, etc. Sessions also test control of attached satellites after docking and simulate “Lost in Space” scenarios. The payload consists of up to three self-contained 8-inch dia. free-floating satellites which perform the various algorithms (control sequences), commanded and observed by the crew members which provide feedback to shape algorithm development. Each satellite has 12 thrusters and a tank with CO<sub>2</sub> for propellant. The first tests, in May 2006, used only one satellite (plus two beacons – one mounted and one hand-held); a second satellite arrived on ULF1.1, the third on 12A.1. Formation flight and autonomous docking are important enabling technologies for distributed architectures.]*

The CDR did the daily routine maintenance of the SOZh environmental control & life support systems in the SM, including ASU toilet facilities systems/replaceables.

Mike L-A and Mikhail Tyurin each used the video equipment with camcorder to tape a half-hour informational “sightseeing tour” of their respective segments (USOS & RS) for a training review by the Soyuz TMA-10/14S crew, to arrive on 4/9 (including Dr. Charles Simonyi, who'll stay two days longer than all previous private “space tourists”).

At ~10:20am EDT, the crew had their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

All crewmembers are working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copies L-A's, Misha's, and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his Russian discretionary “job jar” task list, the FE-1 performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also off the voluntary job list, Tyurin conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. [Today's Uragan photo targets were the Huascarán volcano in northern Peru, the Far East, and volcanoes of New Zealand.]

An additional voluntary job for Misha today: using the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). [KPT-3 photography has been a frequent earth observing experiment for ECON. Today's targets were the environmental situation of water surface areas in the Pacific Ocean, Gulf of Mexico and Caribbean Sea.]

At ~8:36PM EDT, the crew will set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 8:40pm conduct a ham session with students at Juvenile Space Club in Tatsuno, Tatsunomachi, Nagano Prefecture, Japan.

### **Weekly Science Update (Expedition Fourteen -- 26<sup>th</sup>)**

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Photos and data downlinked on 3/15 show nominal performance and configuration for ALTCRISS.

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BASE:* Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA):* Complete.

*CBOSS (Cellular Biotechnology Support Systems):* Complete.

*CFE (Capillary Flow Experiment):* Planned.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* For GHab, Side 1 of the experiment is complete. The ground has photos of third grade students conducting the ground controls in their classrooms. They seem very excited by the differences they see between flight and ground. For CHab, the ground team and PIs are currently evaluating the condition of the worms, both in CHab1 (mutant variety) and CHab2 (wild type) since growth and movement seem to have slowed for both. Investigators are comparing to ground controls to see if the slowdown can be attributed to spaceflight or may be some other factor such as the age of the media. The team is evaluating different options for future operations. The first phase of the *C.elegans* experiment which involved middle and high school students from around the US, Canada, and Malaysia, is wrapping up. Students have evaluated over 900 images, all that will be done for this phase, and the data is being compiled.

*CULT (Cultural Factors Questionnaire):* Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test):* Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* Complete.

*EPO (Educational Payload Operation):* Complete.

*ETD (Eye Tracking Device):* Complete.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology):* Planned

*GRAVI (Threshold Acceleration for Gravisensing):* Complete.

*IMMUNO (Saliva Sampling):* Complete.

*LEUKIN:* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*NOA (Nitric Oxide Analyzer):* Complete.

*Nutrition:* "L-A, you're done with Nutrition – on orbit. It's more sweet than bitter for us, too, but we won't be able to inconvenience you again until your return to Star City. You've been fantastic and we're all very grateful for your work. Just remember, when you get back, it's not us putting the dietary restrictions on you, it's Renal Stone.

*PFE-OUM (Periodic Fitness Evaluation - Oxygen Uptake Measurement):* Planned for FE-2.

PK-3 (*Plasma Crystal 3*): In progress.

PMDIS (*Perceptual Motor Deficits in Space*): Complete.

POEMS (*Passive Observatories for Experimental Microbial Systems in Micro-G*): Complete.

RC (*Refrigerated Centrifuge*): Planned.

RS (*Renal Stone*): The Renal Stone PI team has confirmed receipt of the BCR (Bar Code Reader) data. The completion of this week's Renal Stone session on ISS marks the last in-flight session for this experiment. The Renal Stone experiment has collected inflight samples from 20 subjects during 9 increments since its first flight on Expedition 3. Considering an earlier version of Renal Stone on the NASA/Mir program and this experiment's extended implementation timeframe on ISS, this brings to a close an experiment that many individuals have helped in making a success.

SAMPLE: Complete.

SEM (*Space Experiment Module*): Complete.

SLEEP (*Sleep-Wake Actigraphy & Light Exposure during Spaceflight*): Planned.

SPHERES (*Synchronized Position Hold, Engage, Reorient, Experimental Satellite*): "From the real-time video and audio feed the 6th SPHERES test session, from 3/17 was highly successful. Our observations confirm an important milestone for SPHERES: the third SPHERES satellite, launched aboard STS-116, is fully operational, meaning that the full SPHERES facilities are now aboard station! Further, the other tests provided substantial data for four MIT theses due this year (denoted by numbers in parenthesis): - All docking tests performed within our expectations, increasing our confidence in upcoming sessions to perform complex tumbling tests. - The fault simulation maneuvers created faults at good times, where the avoidance maneuvers were clearly visible. The trajectory tests for formation flight, which had been delayed for the past two sessions, ran successfully. The reconfiguration maneuvers --- determining how to control a system after docking --- also ran correctly, providing the "control data" for upcoming tests. In addition, the Mass ID tests appeared to run successfully for the first time; if the data confirms this, we will no longer have to run further Mass ID tests. Thanks Suni and LA for choosing SPHERES for Saturday Science. Your efforts are helping a great number of students complete their research, which in turn we are sure will help numerous future missions.

Swab (*Characterization of Microorganisms & Allergens in Spacecraft*): Planned.

TRAC (*Test of Reaction & Adaptation Capabilities*): Four sessions were held successfully (3/9).

TROPI (*Study of Novel Sensory Mechanism in Root Phototropism*): Complete.

YING (*Yeast in No Gravity*): Complete.

CEO (*Crew Earth Observations*): Through 3/21 the ground has received a total of 6,506 of ISS/CEO images for review and cataloging. "We are pleased to report your successful acquisition of 8 long-lens views of the tiny impact crater site: Ile Rouleau on Lake Mistassini in Quebec Province, Canada. Nice work! Your beautiful recent view of the Isla Guanaja on the north coast of Honduras in the western Caribbean Sea will be published on NASA/GSFC's Earth Observatory website this weekend. Its unspoiled reefs and mostly undeveloped landscape help create an idyllic image of a Caribbean isle".

Today's CEO (Crew Earth Observation) photo targets were **Jamestown, Virginia** (*this National Historical Site is situated on a small island near the north shore of the James River Estuary at 37.21N 76.77W. The 400<sup>th</sup> Anniversary of the founding of this settlement will be observed in May. Researchers have a standing request for long lens views of this site and its surroundings. On this pass the crew was to aim right of track southwards towards Norfolk and then northwestward up the James River Estuary*), **Florida Coastal Everglades** (*this LTER [Long Term Ecological Research] site encompasses most of the wetlands and coastal waters of south Florida and is centered at 25.47N 80.85W. Most of the target lies well left of track on this pass. However, useful context views are possible in the Florida Bay area from Key West to Cape Sable to Key Largo*), **Johnston Island reef, Central Pacific** (*this small isolated reef and group of islands is centered near at 16.45N 169.32W, over 1300km southwest of Honolulu. The islands are relatively barren. The largest one, Johnston does have an airstrip. Looking just right of track and trying mapping this area in detail*), and **Wake Island reefs, NW Pacific** (*this small, but famous atoll is of the western Central Pacific, situated over 3,600 km west of Honolulu at 19.18N 166.38E. Detailed views are requested as part of an international survey and inventory of the Earth's coral reef systems. ISS had a nadir pass.*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:45am EDT [= epoch]*):

Mean altitude -- 336.4 km

Apogee height -- 346.5 km

Perigee height -- 326.3 km

Period -- 91.26 min.

Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0015039  
Solar Beta Angle -- 1.8 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 95 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47740

**Significant Events Ahead** (*all dates Eastern and subject to change*):

03/27/07 -- Progress M-58/23P undocking (from SM aft port, 2:11pm) & reentry (7:19pm)  
03/29/07 -- Soyuz TMA-9/13S relocation #2 (FGB nadir port to SM aft port, 6:28pm–6:53pm)  
04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:03pm)  
04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:11am) & land (9:30am)  
TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)  
TBD -- STS-117/13A docking  
TBD -- STS-117/13A undocking  
TBD -- STS-117/13A landing @ KSC  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
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10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/23/07  
**Date:** Friday, March 23, 2007 11:56:40 AM  
**Attachments:**

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### **ISS On-Orbit Status 03/23/07**

All ISS systems continue to function nominally, except those noted previously or below. *Current crew work/sleep cycle: 8:00am – 11:30pm EDT (until 3/28).*

*>>>Today 95 years ago, Wernher von Braun was born in Wirsitz, Pommerania (March 23, 1912).<<<*

CDR Lopez-Alegria supported his current SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) experiment by accessing the SLEEP software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]*

Three hours are set aside today for the two NASA crewmembers to finish up the first part of installing the ISL (Integrated Station LAN) cabling in the Lab, including clean-up afterwards. *[The Lab installation yesterday & today concerns the main ISL backbone cable which, along with others to be strung at a later time, will eventually provide the connectivity from the ISL Router mounted in the AV-2 (Avionics #2) rack on 3/19 to the Node, Airlock, Node 2, Lab payload connections, and to laptops or other support equipment in the Lab. One EWIS (External Wireless Instrumentation System) cable will also be installed as a get-ahead. ISL installation and transition were planned for Increment 15, but with the 13A slip some tasks have now been moved to the current Increment. The Lab cable routing was broken in three major tasks: Aft endcone, Port standoff, and Forward endcone. Activities started yesterday by rotating the LAB1P6 rack and removing wall panels in the Aft alcove. The rack rotation posed some temporary problems, causing a delay of about 20 min. Today, Williams finished up with closeout operations.]*

The three crewmembers are undertaking another run, their fifth, with the NASA-

sponsored German/Canadian experiment TRAC (Test of Reaction & Adaptation Capabilities). As before (3/8), Sunita Williams sets up the video gear and assembled the TRAC hardware in the work area (i.e., laptop, joystick, headphones, and time box). Afterwards, Sunita, Mikhail and L-A perform their individual data take sessions. Later, the last one (CDR) will close out and stow the equipment. *[TRAC tests the idea that the decrease in motor skills reported by some astronauts (for example, hand-eye coordination), is due to the brain adapting to being in space. By testing hand/eye coordination of crewmembers, scientists hope to test the theory that while the brain is adapting its sensory-motor functions to space it is unable to fully provide the resources necessary to perform normal manual skills, i. e., the data will be used to show that adaptation to zero-G draws on resources normally used for computational tasks, for example. Crewmembers test their hand-eye coordination prior to the mission, while on orbit and then again when they have returned to Earth. TRAC hardware includes a laptop mounted to a table and a joystick to control the cursor on the PC screen. Also used are audio headphones and a reaction time box to respond to audio and visual stimuli. For the test the crewmember is sitting on the floor of the Lab module, with legs restrained and the work table on the legs.]*

In preparation of next week's undocking of Progress M-58/23P, FE-1 Tyurin unbolted and removed the cargo ship's US-21 matching unit in its container box. *[The BITS 2-12 onboard telemetry measurement system and VD-SU monitoring mode, turned off for the activity, were later reactivated. The US-21, with its associated commutator gear, provides the electronic interface between the Service Module (SM) and the Progress for SM computer control of Progress propulsion. When a Progress is undocked and jettisoned, the valuable electronics are retained in storage, to be recycled on a future vehicle.]*

The FE-1 also disassembled and removed the hardware and Telescience gear of the Russian/German Plasma Crystal-3 Plus (PK-3+) payload which he had set up in the SM for automated operation four days ago (3/19).

Lopez-Alegria and Tyurin have 2.5 hrs today for more prepacking equipment to be returned on Soyuz TMA-9/13S when it departs the station with the Expedition 14 crew and SFP Simonyi on 4/19. *[A preliminary hardware list of ~60 Russian items has been uplinked for the loading activities.]*

Tyurin performed another internal pressure check on the newly delivered BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator, to check for hermeticity. The unit was charged by him on 3/7 with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#21). *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

Mikhail also took the monthly sensor readings of the Russian “Pille-MKS” radiation dosimetry experiment, which has ten sensors placed at various locations in the Russian segment (port cabin window, starboard cabin window, ASU toilet facility, control panel, etc.).

Later today, Mike L-A and Sunita will fill out their regular weekly FFQs (Food Frequency Questionnaires) on the MEC (Medical Equipment Computer), his 24<sup>th</sup> and Suni’s 13<sup>th</sup>, which keep a personalized log of their nutritional intake over time on special MEC software. *[The FFQ records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

The CDR is scheduled for another inspection of the onboard CWC (Contingency Water Containers) for their condition.

L-A is to disconnect the regular ITCS LTL (Internal Thermal Control System/Low Temperature Loop) coolant jumper from the LAB1D6 rack which supported CDRA (Carbon Dioxide Removal Assembly) cooling.

Shortly before dinner time (9:10pm EDT), FE-2 Williams will conduct her routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Also on today’s timeline for Sunita is another periodic atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit).

Batteries are to be replaced if necessary. *[CSA-CP measurements are to be gathered with the new 12A.1 units #1051 (prime) & #1044 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #2007 for CO<sub>2</sub> in SM (panel 449) and Lab, along with battery ticks. The instruments will be turned off afterwards, except for #1051, and returned to their regular locations.]*

Using his test tube kit with individual cotton swabs, Mikhail Tyurin will be conducting the periodic surface sampling in the FGB from equipment and structural locations (behind panels, on panels in soiled areas, etc.). The test tubes are to be returned

on Soyuz TMA-9/13S on 4/20.

Afterwards, Misha is to work on reactivating the Russian SKV1 air conditioner after its recent troubleshooting, to restore condensate collection and transfer from the machine. *[The IFM (inflight maintenance) calls for deactivating a SIGNAL-VM smoke detector in the SM, removing panels, connecting a hose to the SKV1 heat exchanger unit (BTA), which Tyurin installed on 3/1 in place of the old unit, inspecting the condensate line (MOK) to the condensate pump (NOK1), closing panels and reactivating the smoke detector on TsUP Go.]*

At ~5:05pm, Suni Williams is scheduled to perform the monthly 40-min PEP (Portable Emergency Provisions) safety inspection, her third. *[The IMS (Inventory Management System)-supported inspection involves verification that PFEs (Portable Fire Extinguishers), PBAs (Portable Breathing Apparatus), QDMAs (Quick-Don Mask Assemblies) and EHTKs (Extension Hose/Tee Kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware. In the U.S. segment (USOS), there are a total of 5 PFEs and 7 PBAs, plus 7 QDMAs and 4 EHTKs. In the Node, Williams ensures that no more than three PBA bottles are stowed in the locker, to reduce the risk of getting too much oxygen concentration inside the stowage area in case of bottle leakage. The QDMA checks include tightening the fasteners if necessary.]*

Williams has the daily routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS) on her schedule today, including ASU toilet facilities systems/replaceables.

Also on Suni's schedule is the regular bi-monthly reboot of the OCA Router SSC (Station Support Computer) laptop.

All crewmembers are working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, CDR), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni will copy L-A's, Misha's, and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his Russian "job jar" discretionary task list, Tyurin will complete the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily*

*monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A second item on the “time permitting” job list for the FE-1 was the periodic status check on the long-term BIO-5 Rasteniya-2 (“Plants-2”) micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

Also suggested at Misha’s discretion today was another run of the Russian “Uragan” (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today’s Uragan photo targets were Sakhalin Island (eastern coast), the South Kuril Islands, Fujiyama volcano in Japan, and dust storm effects at the Aral Sea.]*

At ~9:15am EDT, Mike L-A and Sunita configured the television hardware and conducted an interactive TV PAO exchange with cadets at the U.S. Naval Test Pilot School at Patuxent River, MD, where both of them had spent part of their military flying career as flight instructors.

At ~10:10am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~10:45am, Tyurin linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Discussions today concerned the current whereabouts of FGB dust collector filters, unclear information in the IMS database about food containers, search for expired SPG Personal Hygiene items, actual quantity of Camelia underwear in Progress M-58 and FGB, etc..]*

At ~11:30am, the crewmembers conducted their regular weekly tagup with the Lead Flight Director at JSC/MCC-H.

*Conjunction Update:* MCC-H trajectory/ballistics specialists continue to monitor a piece of orbital debris (Scout B rocket body, Object 083, which launched the “Secor 5” payload in 1966), with TCA (time of closest approach) on 3/24 (Saturday) morning at ~4:08am EDT. After more tracking, Pc (Probability of Collision) was determined to be Zero. A DAM (Debris Avoidance Maneuver) will not be required.

Today's CEO (Crew Earth Observation) photo targets were **Luquillo Forest, Puerto Rico** *(the Luquillo Experimental Forest is located on the northeast tip of Puerto Rico near 18.32N 65.82W. This LTER (Long Term Ecological Research) Site has been a center of tropical forestry research for nearly a century and is a*

refuge of Caribbean biodiversity. As ISS approached the island from the NW, the crew was to look for the city of San Juan on the coast and then to the forested highlands to the E-SE. This is a challenging target because its location and elevation favor the formation of clouds. ISS had a nadir pass so the crew was to use the long lens for detail), and **Upheaval Dome Impact Crater** (this 170 million year old impact is located in the rugged Canyon Lands area of southeastern Utah at 38.43N 109.90W. Although it is only 10 km in diameter, it is a fairly distinct feature just east of the Green River. As ISS approached the confluence of the Colorado and Green Rivers from the NW, the crew was to look just left of track and use the long lens for detail).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 6:55am EDT [= epoch]):

Mean altitude -- 336.5 km

Apogee height -- 346.4 km

Perigee height -- 326.6 km

Period -- 91.26 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0014722

Solar Beta Angle -- -3.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 84 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47723

**Significant Events Ahead** (all dates Eastern and subject to change):

03/27/07 -- Progress M-58/23P undocking (from SM aft port, 2:11pm) & reentry (7:19pm)

03/29/07 -- Soyuz TMA-9/13S relocation #2 (FGB nadir port to SM aft port, 6:28pm--6:53pm)

04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:03pm)

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:11am) & land (9:30am)

TBD -- STS-117/13A launch -- S3/S4 trusses

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/22/07  
**Date:** Thursday, March 22, 2007 1:46:20 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/22/07**

All ISS systems continue to function nominally, except those noted previously or below. *Current crew work/sleep cycle: 8:00am – 11:30pm EDT (until 3/28).*

CDR Lopez-Alegria supported his current SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) experiment by accessing the SLEEP software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]*

Five hours are set aside today for the two NASA crewmembers to begin the installation of the ISL (Integrated Station LAN) cabling in the Lab. More time (~3 hours) are reserved tomorrow for the cable installation job. *[The Lab installation today & tomorrow concerns the main ISL backbone cable which, along with others to be strung at a later time, will eventually provide the connectivity from the ISL Router mounted in the AV-2 (Avionics #2) rack on 3/19 to the Node, Airlock, Node 2, Lab payload connections, and to laptops or other support equipment in the Lab. One EWIS (External Wireless Instrumentation System) cable will also be installed as a get-ahead. ISL installation and transition were planned for Increment 15, but with the 13A slip some tasks have now been moved to the current Increment. The Lab cable routing is broken in three major tasks: Aft endcone, Port standoff, and Forward endcone. Activities started by rotating the LAB1P6 rack and removing closeout panels in the Aft alcove.]*

FE-1 Mikhail Tyurin set up the Russian biomedical "Pilot" experiment (MBI-15), which requires a table, ankle restraint system and control handles for testing piloting skill in "flying" simulations on a laptop (RSK1) under stopwatch control. He then conducted the experiment for the first time this Increment, supported by tagup with

ground specialists as required. Later, the Pilot-P gear was deactivated, disassembled and stowed. *[Misha had to perform three flight control modes (fixed, slow and fast free-flyer), each one at least five times, after checkout and calibration of the control handles. The setup of the configured work maintenance area was photo documented with the Nikon D1X. Results were stored on the RSK1 disk for return to Earth, and the photos were to be downlinked to the ground via OCA. MBI-15 was done the last time by Valery Tokarev in November 2005 and is also planned for Fyodor Yurchikhin and Oleg Kotov in Increment 15.]*

With two ALTEA CNSM (Anomalous Long-Term Effects on Astronauts Central Nervous System Monitoring) sessions completed this week, FE-2 Williams later today will close out the gear by deleting the old data files on the ER4 ELC (EXPRESS Rack 4 Laptop Computer) and restarting the experiment's DAU (Data Acquisition Unit) with the usual CPU (Central Processing Unit) lockup procedure for the untended (passive) radiation dosimetry. *[Both NASA crewmembers were thanked by the ALTEA ground team for the successful runs. As a cross check, they were also asked for their estimate of how many light flashes they "saw" that led to a button activation during the experiment. ALTEA measures details about cosmic radiation and its interactions with Astronauts' central nervous system. This involves CNS measurements with a 32-channel EEG (electroencephalograph) of the crewmember, plus accurate long-term real-time particle flux dosimetry (DOSI mode) inside the ISS with six particle detectors (originally introduced on Mir). A specific focus of CNSM is on abnormal visual perceptions (such as the often reported phosphenes, - "light flashes", with eyes closed) and the impact of particles on brain functions in micro-G. For comparison, brain stimulation is also done with "known" optical signals (with eyes open). Subjects record their perceptions with a pushbutton device.]*

Lopez-Alegria completed the weekly audit/inventory of the available CWCs and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. Current data indicate that if 13A does not launch until June, water consumables will reach the "skip cycle" on 6/23. To mitigate the launch slip, ~100-200 liters of water will be needed. Two mitigation options currently under assessment are (1) processing technical water to potable water, and (2) launching the needed water on Progress 25P (requiring propellant offloading).]*

Later today, Tyurin is scheduled to conduct the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

Afterwards, the FE-1 will do the daily routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Later, Mike L-A is to update/edit the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Tyurin spent another hour on prepacking equipment to be returned on Soyuz TMA-9/13S when it departs the station with the Expedition 14 crew and SFP Simonyi on 4/19. *[A preliminary hardware list of ~60 Russian items has been uplinked for the loading activities.]*

The FE-1 also has an hour set aside today for gathering trash & discarded equipment and stowing it in the Progress M-58/23P cargo ship-turned-trash can for disposal, based on uplinked lists of identified Russian & US equipment. Transfers are being logged in the IMS (Inventory Management System). *[23P will be jettisoned a week from today (3/27).]*

Afterwards, just before dinner time (9:30pm), L-A and Misha will install the docking mechanism (StM) in 23P. *[The post-reboost venting/purging of the Progress' prop lines is scheduled tomorrow.]*

All crewmembers are working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni will copy L-A's, Misha's, and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his Russian "job jar" discretionary task list, Tyurin will complete the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also suggested for Misha's choice today was another run of the Russian

"Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were Sakhalin Island (eastern coast), the Kuril Islands, the Altai mountain range, and the Katun River valley.]*

Energia/Moscow reported that the Russian air conditioner SKV1 is not ready for operation yet. SKV2 is running satisfactorily.

*Conjunction Advisory:* MCC-H trajectory/ballistics specialists are monitoring a conjunction with orbital debris (Scout B rocket body, Object 083 from 1966), with TCA (time of closest approach) on 3/24 (Saturday) morning at ~4:08am EDT. After more tracking, valid data will be available tonight (~10:09pm) for Pc (Probability of Collision) assessment. If a DAM (Debris Avoidance Maneuver) is required, formal request to TsUP/Moscow would be issued by 11:39pm, for the DAM to be executed at ~10:50pm tomorrow night. Since Progress 23P has its prop lines purged at that time, the maneuver (~0.5m/s, retrograde) would be performed by 24P at the DC1 Docking Compartment.

*ATV Launch Slip:* Latest launch schedule studies indicate that the NET (not earlier than) launch date of the European ATV (Automated Transfer Vehicle) "Jules Verne" may no longer be expected during Increment 15.

Today's CEO (Crew Earth Observation) photo targets were **Sao Paulo, Brazil** (*this megacity is situated inland in the Serra do Mar coastal range of southern Brazil at 23.52S 46.52W. As ISS approached the Atlantic coast from the NW, the crew was to use this nadir pass to map the fringes of this sprawling urban area*), and **Johnston Island reef, Central Pacific** (*this small isolated reef and group of islands is centered near at 16.45N 169.32W, over 1300km SW of Honolulu. The islands are relatively barren. The largest one, Johnston does have an airstrip. Trying to map this area in detail*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:44am EDT [= epoch]*):

Mean altitude -- 336.6 km

Apogee height -- 346.4 km

Perigee height -- 326.8 km

Period -- 91.26 min.

Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0014629  
Solar Beta Angle -- -8.2 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 73 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47707

**Significant Events Ahead** (*all dates Eastern and subject to change*):

03/27/07 -- Progress M-58/23P undocking (from SM aft port, 2:11pm) & reentry (7:19pm)  
03/29/07 -- Soyuz TMA-9/13S relocation #2 (FGB nadir port to SM aft port, 6:28pm–6:53pm)  
04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:03pm)  
04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:11am) & land (9:30am)  
TBD -- STS-117/13A launch -- S3/S4 trusses  
TBD -- STS-117/13A docking  
TBD -- STS-117/13A undocking  
TBD -- STS-117/13A landing @ KSC  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 03/21/07  
**Date:** Wednesday, March 21, 2007 12:52:53 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/21/07**

All ISS systems continue to function nominally, except those noted previously or below. *Current crew work/sleep cycle: 8:00am – 11:30pm EDT (until 3/28). **It's Spring!***

CDR Lopez-Alegria supported his current SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) experiment by accessing the SLEEP software and completing questionnaire entries in the experiment's laptop session file. *[SLEEP is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]*

Also before breakfast, Lopez-Alegria began the third day of his fourth run with the NASA/JSC experiment NUTRITION, which today calls for urine collections. *[The CDR collects samples throughout the day for storage in the MELFI (Minus-Eighty Laboratory Freezer for ISS). The current NUTRITION project expands the previous MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

Securing one sample in the morning also completed the CDR's "prescribed" 24-hour urine collection for his third (and last) NASA/JSC renal (kidney) stone session. Before stowing the hardware later today, the CDR will take documentary photographs of the kit, pill pallets and logbooks. *[This long-range preventive medicine investigation features daily random ingestion of either potassium citrate or placebo tablets at dinnertime. The NASA-JSC double-blind "Renal Stone" research study investigates methods to prevent formation of kidney stones in zero-G. Part of the experiment consists in keeping a metabolic diet log (food and fluid intake), followed by collection of urine samples several times per day during each session,*

*which terminates tomorrow morning (1/10). The PI (Principal Investigator) receives the diet log data approximately 24 to 48 hours after the diet-logging session is completed.]*

Right after breakfast (~9:00am EDT), FE-2 Williams worked on the two Lab VTRs (video tape recorders), replacing their tapes with the recordings of the effects of yesterday's SM DTF (Service Module Dedicated Thruster Firing) on external structure. New tapes were inserted and the old ones stowed for return to Houston. *[The Cupola RWS (Robotics Work Station) and MRS MBS (Mobile Remote Servicer/ Mobile Base System) were powered up yesterday to provide MBS Mast camera video support of photogrammetry of the P4 radiator and solar arrays during the DTF. The objective of this testing is to excite primary loads in the ISS to validate current ISS structural models.]*

With Lopez-Alegria's completion yesterday of a successful ALTEA-CNSM (Anomalous Long-Term Effects on Astronauts-Central Nervous System Monitoring) session, it is Williams' turn today as subject. After restarting the DAU (Data Acquisition Unit) with the usual CPU (Central Processing Unit) lockup procedure, deleting yesterday's data from the CNSM laptop and configuring CNSM cabin dosimetry instrumentation, Sunita donned the brain electrode helmet today for her session, after which the hardware was disassembled and removed. *[Background: ALTEA measures details about cosmic radiation and its interactions with Astronauts' central nervous system. This involves CNS measurements with a 32-channel EEG (electroencephalograph) of the crewmember, plus accurate long-term real-time particle flux dosimetry (DOSI mode) inside the ISS with six particle detectors (originally introduced on Mir). A specific focus of CNSM is on abnormal visual perceptions (such as the often reported phosphenes, - "light flashes", with eyes closed) and the impact of particles on brain functions in micro-G. For comparison, brain stimulation is also done with "known" optical signals (with eyes open). Subjects record their perceptions with a pushbutton device. ALTEA equipment can be used separately or in any combination, permitting several different experiments: in physics, dosimetry, psychophysics, electrophysiology and cognitive neurophysiology. The NASA-sponsored ALTEA-CNSM, developed by the Italian Space Agency (ASI) and the Italian firm Alenia Spazio, is assigned to Increments 13, 14 and 15. Its predecessor ALTEINO was performed on ISS in April 2002 by Roberto Vittori during his Soyuz taxi mission.]*

In support of the on-going biomedical urine collections, FE-1 Tyurin tested the cabin atmosphere by sampling in the SM with the CMS (Counter Measure System) Trace Contaminant Analyzer which allows real-time gas monitoring of potential harmful contaminants (HCHO/Formaldehyde, CO/Carbon Monoxide, NH<sub>3</sub>/Ammonia, O<sub>3</sub>/Ozone, plus Benzene) in special CMS chip cassettes.

In preparation for tomorrow's and Friday's planned installation of ISL (Integrated Station LAN) cabling in the Lab (four hours work each for the two NASA crewmembers), the FE-2 later today will clear out stowage gear in the Lab to provide the necessary access. *[The Lab installation on 3/22-23 concerns the main ISL backbone cable which, along with others to be strung at a later time, will eventually provide the connectivity from the ISL Router mounted in the AV-2 (Avionics #2) rack on 3/19 to the Node, Airlock, Node 2, Lab payload connections, and to laptops or other support equipment in the Lab. One EWIS (External Wireless Instrumentation System) cable will also be installed as a get-ahead. ISL installation and transition were planned for Increment 15, but with the 13A slip some tasks have now been moved to the current Increment.]*

Mikhail Tyurin worked on the Vozdukh CO<sub>2</sub> (carbon dioxide) removal system, installing the backup pressure sensor which he unpacked from stowage and readied with the necessary tools on 3/19.

After today's Vozdukh outfitting & activation (Mode 5), at ~4:45pm the FE-1 will reactivate the Elektron-VM oxygen (O<sub>2</sub>) generator (which had to be turned off, along with the BITS2-12 onboard telemetry system and VD-SU control mode) in 32A mode (switching later to 20A), with the usual preceding nitrogen (N<sub>2</sub>) purge of the BZh-9 Liquid Unit and ground specialist tagup. *[The CDR is scheduled to assist by monitoring the external temperature of the secondary purification unit (BD) for the first 10 minutes of operation to ensure that there is no overheating. During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

Later, Mikhail is scheduled to collect water samples downstream of the BKO multifiltration unit for the Elektron O<sub>2</sub> generator, to be returned to the ground for monitoring the quality of the water being fed to the Elektron-VM assembly near the end of a BKO's service life.

Mike L-A powered down the IWIS (Internal Wireless Instrumentation System) in the Lab, Nose, FGB and SM after its structural dynamics data taking during the DTF thruster firing. *[All data from the IWIS RSUs (Remote Sensor Units) were successfully downlinked after the test. The new RSU, swapped on 3/19, exhibited good signal strength. Some troubleshooting on the old SM RSU will be scheduled in the next few weeks.]*

Tyurin worked on the Russian RSK1 laptop, installing new software (Vers. 1.2) for

the upcoming PILOT experiment (3/22) on its HDD (hard disk drive) from a DVD, along with “ghosting” the original laptop display structure. Support was provided by ground specialist tagup. *[The original contents of the HDD (photo images) were saved to a spare HDD on 3/17 for return to the ground.]*

The FE-1 also has another 3h 15m set aside today for gathering trash & discarded equipment and stowing it in the Progress M-58 cargo ship-turned-trash can for disposal, based on uplinked lists of identified Russian & US equipment. Transfers are being logged in the IMS (Inventory Management System). *[23P will be jettisoned a week from today (3/27).]*

In addition, Tyurin will spent about an hour on prepacking equipment to be returned on Soyuz TMA-9/13S when it departs the station with the Expedition 14 crew and SFP Simonyi on 4/19. Lopez-Alegria meanwhile prepacks US return cargo for 13S, currently CHeCS (Crew Health Care systems) and EHS (Environmental Health System) items. *[A preliminary hardware list of ~60 Russian items was uplinked for the loading activities.]*

Mike L-A is to conduct today’s routine maintenance of the SM’s SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Later, L-A will also update/edit the standard daily IMS (Inventory Management System) “delta” file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

On the TVIS (Treadmill with Vibration Isolation & Stabilization), the CDR will perform the regular monthly maintenance, primarily inspecting the condition of the SLDs (Subject Loading Devices), SLD cables and SPDs (Subject Positioning Devices), lubricating as required, plus recording time & date values.

All crewmembers are working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A will copy Suni’s, Misha’s, and his own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Tyurin will service the long-term BIO-5 Rasteniya-2 (“Plants-2”) micro-G growth

payload, by taking the periodic photography of the setup with the Nikon-D1X camera, including the growth of the barley and pea seeds in the Lada-10 greenhouse. The images are then copied to the RSK1 laptop for subsequent downlink to TsUP-Moscow via BSR-TM or OCA. Working off his Russian "time permitting" discretionary task list, the FE-1 additionally performs the periodic status check on the Plants-2 payload. *[Rasteniya researches growth and development of plants under spaceflight conditions in the Lada-10 greenhouse. The regular maintenance of the experiment (generally each Monday, Wednesday, Friday and Sunday) involves monitoring of seedling growth, humidity measurements, moistening of the substrate if necessary, topping off the water tank if ~20-25% of the total amount (4 liters) remains, and photo/video recording. Once weekly, data from the Lada greenhouse control unit are recorded on floppy disk for weekly downlink via REGUL-Packet or the new BSR-TM at a suitable occasion. Experiment purpose is the study of (1) plants cultivation technology ("Mizuna" lettuce, "Micro-Tom" dwarfish tomatoes, dwarfish (red) pea) as applied to standard greenhouse devices, (2) the impact of space flight factors on the growth and evolution of plants which can be potentially used in space vitamin greenhouses, (3) germination & viability of plants, (4) reproductive properties of plants, and production of the second generation of space seeds, (5) chemical composition of plants and seeds grown in zero-g conditions to define the content of nitrocompounds in vegetable biomass, etc.]*

Working off his Russian "job jar" discretionary task list, Tyurin is expected to complete the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also suggested for Misha's voluntary choice today was another run of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were Sakhalin Island (eastern coast), the Kuril Islands, Lake Baikal, and the Volcano Fujiyama in Japan.]*

At ~9:05pm tonight, the crew will downlink TV messages & greetings to TsUP/Moscow for five upcoming Russian events. *[The events are (1) the 60<sup>th</sup> Anniversary of RSC-Energia's KIS (Integrated Test Facility), to be observed on 4/19 at the GONTI (State Science & Technology Institute) Auditorium; (2) the 25<sup>th</sup> Anniversary of the Department of Applied Cosmonautics at MIIGAiK (Moscow Institute for Engineers in Geodesics, Aerial Survey & Map-Making); (3) a Gala meeting dedicated to Cosmonautics Day on 4/12 in Cheboksary (Chuvashiya Province); (4) the 22<sup>nd</sup> Russian Open Youth Conference on "National Treasure of*

Russia” at Nepetsino near Moscow; and (5) the 47<sup>th</sup> Anniversary of GCTC (Yu. A. Gagarin Cosmonaut Training Center) at Star City.]

Today's CEO (Crew Earth Observation) photo targets were **Sudbury Impact Crater** (this is the first of two adjacent impact sites in southeastern Ontario, north of Georgian Bay near 46.60N 81.18W. This large, elliptically shaped impact site is about 250 km in diameter and nearly 2 billion years old. As ISS tracked east-southeastward north of Lake Huron, the crew was to look left of track for a mapping pass. Continuing shooting eastward towards Lake Wanapitei, the next target), **Wanapitei Impact Crater** (this 7.5km diameter impact site is just E of the Sudbury Site and is marked by Lake Wanapitei. This much younger site is just 37 million years old. Again aiming just left of track near 46.75N 80.75W and mapping the lake and its surroundings), **Harvard Forest, Vermont** (the Harvard Forest is an LTER [Long Term Ecological Research] site located in a rural setting in north-central Massachusetts about 70 miles W of Boston near 42.54N 72.17W. The 1200-hectare site lies in the Transition Hardwood-White Pine-Hemlock forest region, and includes a variety of forests and wetlands. Looking ahead for the shape Quabbin Reservoir as ISS approached from W-NW. It is probably still frozen. Just left of track the target area is roughly defined by the triangle formed by the towns of Petersham, Athol, and Orange. Using the long lens for a detailed mapping of this area, especially just NW of Petersham), and **Pilcomayo River dynamics, N Argentina** (the Rio Pilcomayo breaks out of the Andes Mountains near the northern border of Argentina and plunges southeastward towards the broad Parana River valley. It has formed an extensive megafan east of the Andes and now the flow of the river all but disappears into this alluvial material. On this pass, most of the target area (centered near 24S 61W) was well right of track. Trying for a contextual mapping pass of the river from NW to SE).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:34am EDT [= epoch]):

Mean altitude -- 336.7 km

Apogee height – 346.4 km

Perigee height -- 326.9 km

Period -- 91.27 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0014576

Solar Beta Angle -- -13.1 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 92 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47692

**Significant Events Ahead** (*all dates Eastern and subject to change*):

03/27/07 -- Progress M-58/23P undocking (from SM aft port, 2:11pm) & reentry (7:19pm) **[new times]**

03/29/07 -- Soyuz TMA-9/13S relocation #2 (FGB nadir port to SM aft port, 6:28pm–6:53pm)

04/07/07 -- Soyuz TMA-10/14S launch (E-15+VC12/SFP Simonyi, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, 3:03pm)

04/20/07 -- Soyuz TMA-9/13S undocking (E-14+VC12/SFP Simonyi, 6:11am) & land (9:30am) **[date corrected]**

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)

06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)

07/07/07 -- STS-118/13A.1 undocking (NET)

07/12/07 -- STS-118/13A.1 landing (NET)

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch

08/18/07 -- Progress M-61/26P docking (DC1)

08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*

08/26/07 -- STS-120/10A -- Node 2 launch

08/28/07 -- STS-120/10A – Node 2 docking

09/04/07 -- STS-120/10A undocking

09/07/07 -- STS-120/10A landing

09/07/07 -- ATV (Automated Transfer Vehicle) launch (NET)

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing

Late Oct/early Nov -- US EVA-10,-11,-12

11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/20/07  
**Date:** Tuesday, March 20, 2007 12:36:01 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/20/07**

All ISS systems continue to function nominally, except those noted previously or below.

Onboard sleep shift to support next week's Soyuz relocation is now complete. The crew wakes up at 12:00 GMT (8:00am EDT) and goes to sleep at 03:30 GMT (11:30pm EDT) until 3/28.

CDR Lopez-Alegria is completing the second day of his fourth session with the NASA/JSC experiment NUTRITION, for which he had to forego exercising and food intake for eight hours. During the session, he collects blood samples (assisted by FE-2 Williams), which are first spun in the RC (Refrigerated Centrifuge) and then placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC will later be powered off after a temperature reset to limit wear on the compressor, and cleaned. Urine samples are also being collected several times during the day and stored in the MELFI. *[Background: The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition*

*and implications for rehabilitation. Note: The MELFI Brayton machine will be temporarily powered down during the DTF (dedicated thruster firing) later today.]*

Second day for Lopez-Alegria's third (and last) NASA/JSC renal (kidney) stone session, collecting urine samples throughout the day and keeping his dietary/metabolic log entries up to date. Last day of diet logging. *[This long-range preventive medicine investigation features daily random ingestion of either potassium citrate or placebo tablets at dinnertime. The NASA-JSC double-blind "Renal Stone" research study investigates methods to prevent formation of kidney stones in zero-G. Part of the experiment consists in keeping a metabolic diet log (food and fluid intake), followed by collection of urine samples several times per day during each session, which terminates tomorrow morning (1/10). The PI (Principal Investigator) receives the diet log data approximately 24 to 48 hours after the diet-logging session is completed.]*

FE-1 Tyurin set up Laptop 3 and the Russian "Relaksatsiya" spectrometer & video camera at Service Module (SM) window 12, then began his first session of the Plasma-ISS (Bridge-2) experiment, aimed at registering Xenon jet luminosity values from the two PCUs (plasma contactor units) installed on the U.S. Z1 truss and their interaction with ionospheric flow. Measurements are taken in eclipse (orbital night), and the experiment hardware will later be torn down and stowed. The activities are supported by specialist tagup via S-band. Both PCUs were activated at 10:30am and will until 4:15pm EDT. *[The experiment studies near-station and ISS surface electroplasmic processes and their effects on ISS systems and elements. The US solar arrays create static-electricity potentials on the structure, and two PCUs (Plasma Contactor Units) are commonly used during EVA (or tests) to emit Xenon plasma to keep shell surface potentials at <40V. Because of the high orbital speed (i.e. high collision energy between the Xenon plasma and atmospheric oxygen) a weak optical emission (glow) can be observed. The experiment uses the onboard "Relaksatsiya" ("relaxation") equipment with its Fialka-MV-Kosmos multispectral hardware (spectrometer, video camera plus Laptop 3 software) to observe the PCU plasma jet emission luminescence from SM windows #12 & #13 today.]*

After temporarily moving prepacked stowage out of the way, Lopez-Alegria and Williams are to configure the ALTEA (Anomalous Long-Term Effects on Astronauts) equipment for another session with the CNSM (Central Nervous System Monitoring) brain electrode helmet, activating the dosimeters, running a functions test and then conducting the experiment, with L-A the subject and Sunita the operator. A second session, with the FE-2 as subject, will be conducted tomorrow. *[Background: ALTEA measures details about cosmic radiation and its interactions with Astronauts' central nervous system. This involves CNS measurements with a 32-channel EEG (electroencephalograph) of the crewmember, plus accurate long-term real-time particle flux dosimetry (DOSI mode)*

*inside the ISS with six particle detectors (originally introduced on Mir). A specific focus of CNSM is on abnormal visual perceptions (such as the often reported phosphenes, - "light flashes", with eyes closed) and the impact of particles on brain functions in micro-G. For comparison, brain stimulation is also done with "known" optical signals (with eyes open). Subjects record their perceptions with a pushbutton device. ALTEA equipment can be used separately or in any combination, permitting several different experiments: in physics, dosimetry, psychophysics, electrophysiology and cognitive neurophysiology. The NASA-sponsored ALTEA-CNSM, developed by the Italian Space Agency (ASI) and the Italian firm Alenia Spazio, is assigned to Increments 13, 14 and 15. Its predecessor ALTEINO was performed on ISS in April 2002 by Roberto Vittori during his Soyuz taxi mission.]*

The FE-1 has almost 4 hrs set aside today to continue gathering trash & discarded equipment and stowing it in the cargo ship-turned-trash can for disposal, based on an uplinked list of identified equipment (53 Russian items; 41 U.S. items). Transfers are being logged in the IMS (Inventory Management System). *[23P will be jettisoned a week from today (3/27).]*

In support of the on-going biomedical sampling (urine), Mikhail collected cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Sunita is scheduled to conduct today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Later, Suni will also update/edit the standard daily IMS "delta" file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Misha is to attend to the standard weekly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), checking the condition of the roller bearings and record its time & date values.

All crewmembers are working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni will copy L-A's, Misha's, and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his Russian "job jar" discretionary task list, Tyurin is expected to complete the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also suggested for Misha's choice today was another run of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were volcanoes on Kamchatka, Sakhalin Island and the South Kuril Islands, the Far East's ocean shore, the Altai Mountains, and the Katun River valley.]*

*DTF Update:* The SM DTF (Dedicated Thruster Firing) for IWIS (Internal Wireless Instrumentation System) testing is scheduled today from 2:50pm–3:06pm EDT, to be measured for structural response by the newly set up IWIS in the FGB and SM. Commanded by a prestored Russian program ("cyclogram"), each of the five thruster firings will last only a very short time (0.4 - 0.6 seconds), spaced 200 seconds apart. The DTF will be preceded by attitude control going to free drift (2:46pm) and followed at ~3:12pm by attitude control handover to the Russian MCS (Motion Control System) for returning back to the current +XVV TEA (+X-axis in Velocity Vector/Torque Equilibrium Attitude), after which US momentum control with CMGs (Control Moment Gyroscopes) takes over (~3:47pm). The Lab window shutter is kept closed for the duration of the thruster firings.

*23P Prop Transfer Update:* At 5:59pm, monitored by Moscow on Daily Orbit 14, the SM's automated daily timeline sequencer (SPP) will issue the start command for remaining Progress M-58 propellants being transferred from the 23P SD (refueling system) tanks to the FGB high-pressure fuel & oxidizer tanks (BVDG, BVDO), followed by the transfer of fuel remaining in the Progress' KDU propulsion section/tanks. *[Today's transfers are estimated at ~360 liters of fuel (UDMH/unsymmetrical dimethyl hydrazine) and ~360 liters of oxidizer (NTO/nitrogen tetroxide), with the total transfer taking ~170 minutes.]*

Today's CEO (Crew Earth Observation) photo targets were **Beaverhead Impact Crater** (*this 60-km diameter impact site is estimated to be nearly 600 million years*

old. It is situated in a broad, N-S valley near the Montana-Idaho border near 44.6N 113.0W. ISS had a nadir pass in fair, cold weather. The crew was to use the long lens for detail), **Yellowstone National Park, Wyoming** (this area is being monitored for environmental changes in land use. Trying for a near-nadir mapping strip from just W of Yellowstone Lake to just N of Jackson Lake. Target center point is 44.5N 110.0W), **Kingman Reef, Hawaiian Island chain** (this large triangular-shaped reef is situated just north of the Equator in the Northern Line Islands near 6.24N 162.22W. Detailed mapping views are requested as part of a global survey and inventory of coral reefs. ISS had a near nadir view), and **Palmyra Atoll, Central Pacific** (this beautiful reef and open-ended atoll with a visible airstrip is located near 5.52N 162.06W. Again using the long lens for detailed mapping).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:27am EDT [= epoch]):

Mean altitude -- 336.7 km

Apogee height -- 346.5 km

Perigee height -- 327.0 km

Period -- 91.27 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0014553

Solar Beta Angle -- -18.0 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 71 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47676

**Significant Events Ahead** (all dates Eastern and subject to change):

03/20/07 -- SM dedicated thruster testing (2:50pm–3:17pm)

03/27/07 -- Progress M-58/23P undocking (from SM aft port, 2:07pm) & reentry

03/29/07 -- Soyuz TMA-9/13S relocation (FGB nadir port to SM aft port, 6:25pm–6:53pm)

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15+VC12/Simonyi, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, ~3:03pm)

04/19/07 -- Soyuz TMA-9/13S undocking (SM aft, Exp.14+VC12/Simonyi) & land (6:11am/9:30am)

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
09/07/07 -- ATV (Automated Transfer Vehicle) launch (NET)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/19/07  
**Date:** Monday, March 19, 2007 2:23:51 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/19/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 26 of Increment 14.*

Wake-up today: 8:00am, sleep time tonight: 11:30pm EDT.

CDR Lopez-Alegria supported his next seven-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) assessment by filling in the sleep log and questionnaire entries in the experiment's laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]*

Lopez-Alegria began his third (and last) NASA/JSC renal (kidney) stone session, starting the diet log and later setting up the experiment hardware for the 24-hr. void-by-void urine collection beginning tomorrow morning and ending on Wednesday morning (3/21). *[This long-range preventive medicine investigation features daily random ingestion of either potassium citrate or placebo tablets. It is Dr. Peggy Whitson's double-blind research study investigating methods to prevent formation of kidney stones in zero-G. Part of the experiment consists in keeping a metabolic diet log (food and fluid intake), followed by collection of samples several times per day.]*

Later tonight, Mike L-A is also scheduled to unstow and set up the hardware for the blood collection part of his next session with the NUTRITION experiment. *[The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts, collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples (plus an additional postflight sample), made possible by the MELFI/Minus Eighty Degree Celsius Laboratory Freezer for*

ISS).]

FE-1 Mikhail Tyurin made preparations for another experiment session with the Russian/German Plasma Crystal-3 Plus (PK-3+) payload by unstowing, gathering and setting up its hardware, Telescience gear and two manometer pressure gauges. New software was uploaded from a USB stick, the software installation checked out and the readiness of the experiment verified. Telescience transmission via BSPN payload server digital video line will be terminated later tonight. The experiment will run in automated mode and end on 3/23. *[The experiment is being performed on plasma, i.e., fine particles, charged and excited by RF/radio frequency power, inside the evacuated work chamber where they are studied in various modes and with various RF-discharge power levels, pressures, and quantities of particles. Main objective is to study dust plasma crystallization processes at a specified power of HF (high frequency) discharge, pressure, and a varied number of particles with subsequent reduction of HF discharge power, then to observe melting of the structures formed earlier.]*

The FE-1 performed another internal pressure check on the newly delivered BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator, to check for hermeticity. The unit was charged by him on 3/7 with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#21). *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

CDR Lopez Alegria worked on the Russian SKV-1 air conditioner, conducting checkouts of its condensate pump (NOK-1) and the condensate line (MOK) from the pump to the SKV-1. *[SKV-1 has shown some offnominal behavior after new component installation, not producing condensate. "Tweaking" of different loop settings and temperatures has been tried by TsUP/Moscow in the recent days, apparently without much success. SKV-2 is functioning nominally but has been shut off temporarily for the troubleshooting, as has been an adjacent smoke detector.]*

L-A also conducted an inventory of stowed IMV (Intermodular Ventilation) hardware in the FGB and SM, auditing air ducts, fans, and component bags for subsequent downlink the TsUP via OCA.

Sunita Williams worked on the IWIS (Internal Wireless Instrumentation System), replacing the RSU (Remote Sensor Unit, #1028) in the SM and its cable with a spare (#1035) and set up the IWIS for recording structural dynamics data of the SM dedicated thruster firing (DTF) coming up tomorrow (3/20).

In preparation for using the SAMS (Space Acceleration Measuring System) and

MAMS (Microgravity Acceleration Measurement System) to monitor the SM DTF, Mike L-A will configure the ER1 (EXPRESS Rack 1) later today by connecting its MTL (Moderate Temperature Loop) cooling jumper QDs (quick disconnects) to the nearby LAB1O2 UIP (Utility Interface Panel, "Z-panel"). Tonight, he will turn on the SAMS ICU (Interim Control Unit).

Mike LA connected the Lab SONY PD100 camcorder via data cable to the SVG (Space Video Gateway) and powered up the latter. Afterwards, he played back & downlinked a SAFER (Simplified Aid for EVA Rescue) checkout video through the SVG via Ku- & S-band, then turned power off and disconnected the camcorder from the SVG.

As first step for the planned installation of a backup pressure sensor on the Vozdukh CO<sub>2</sub> (carbon dioxide) removal system scheduled on Wednesday (3/21), Tyurin unpacked the sensor from stowage and gathered the necessary tools.

Using the "Elektronika" MultiMeter (MMTs-01), the FE-1 ran a series of electrical continuity tests on the ASN Satellite Navigation System, supported by ground specialist tagup. *[ASN will be required for the arrival of the European ATV (Automated Transfer Vehicle) "Jules Verne" late this year.]*

After crew lunch (1:45pm-2:45pm) FE-2 Williams will continue ISL (Integrated Station LAN) activities by installing the ISL Router and associated hardware in the Lab Avionics Rack #2 (AV-2), moving Airlock (A/L) stowage out of the way and installing ISL Ethernet jacks and the Node-A/L Vestibule Ethernet. Afterwards, Suni is to reconfigure the A/L stowage. All activities are being photo documented with a DCS 760 camera. *[ISL is an upgraded on-board LAN utilizing Ethernet connectivity over an ISL Router via cable or wireless (WAP/ Wireless Access Point). ISL integrates all ISS "user" devices, eventually including RS (Russian segment) docking video distribution, payload comm & downlink (from IP modules, e.g., Columbus or JEM), crew operations, procedures viewing, email, IP phone, etc. ISL eliminates drag-through cables in hatches, will be up to ten times faster than the current OpsLAN, and has provisions for future modules. Its installation and transition were planned for Increment 15, but with the 13A slip some tasks have now been moved to the current Increment, viz.: installation of the ISL Router & "backbone" cabling in the Lab as well as ISL cabling in the Node (complete) and A/L (today). Cable routing in the Lab will be done on 3/22-23.]*

Mikhail is to conduct today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Tyurin also will update/edit the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

All crewmembers are working out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni will copy L-A's, Misha's, and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his Russian "job jar" discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

Also from the "time permitting" job list, Tyurin completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A third suggestion for Misha's choice was another run of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were the east coast of Sakhalin and the Kuril Islands.]*

An additional voluntary job for the FE-1 today: searching for a VV2RO fan flange, opening panels and checking the interior of air ducts with the hand. Covers were then to be closed up again.

At ~9:00am EDT, Suni set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 9:05am conducted a ham session with students at East Aurora Middle School in East Aurora, New York. *[“If you were to light gasoline in space, would the flames float around?”; “Who do you wish you could bring up onto the station?”; “How would you compare flying in the Navy to your ride on the Space Shuttle?”; “What will be*

*your first meal when you come back to Earth?”]*

At ~11:00am, the Robotics MSS (Mobile Service System) was powered up to support the ground-controlled translation of the MT (Mobile Transporter) cart along its rails from Worksite 2 (WS-2) to WS-4, scheduled to take place today at 3-5pm.

*[The move to WS-4 is intended to reduce the surface area exposure of the TUS (Trailing Umbilical System) cable to potential MMOD (Micrometeoroid/Orbital Debris) strikes.]*

*DTF Look-ahead:* The SM DTF (Dedicated Thruster Firing) is scheduled tomorrow at 2:50pm–3:17pm EDT, to be measured for structural response by the IWIS. The DTF will be preceded by attitude control switching to free drift (2:46pm) and followed by being moded back to the current +XVV TEA (+X-axis in Velocity Vector/Torque Equilibrium Attitude).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:18am EDT [= epoch]*):

Mean altitude -- 336.8 km

Apogee height -- 346.4 km

Perigee height -- 327.2 km

Period -- 91.27 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0014269

Solar Beta Angle -- -22.9 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 92 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47660

**Significant Events Ahead** (*all dates Eastern and subject to change*):

03/20/07 -- SM dedicated thruster testing (2:50pm–3:17pm) **[added]**

03/27/07 -- Progress M-58/23P undocking (from SM aft port, 2:07pm) & reentry

03/29/07 -- Soyuz TMA-9/13S relocation (FGB nadir port to SM aft port, 6:25pm–6:53pm)

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15+VC12/Simony, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, ~3:03pm)

04/19/07 -- Soyuz TMA-9/13S undocking (SM aft, Exp.14+VC12/Simonyi) & land  
(6:11am/9:30am)  
TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)  
TBD -- STS-117/13A docking  
TBD -- STS-117/13A undocking  
TBD -- STS-117/13A landing @ KSC  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/24/07 -- Progress M-60/25P undocking (SM aft port) – *to be resolved*  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
09/07/07 -- ATV (Automated Transfer Vehicle) launch (NET)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/18/07  
**Date:** Sunday, March 18, 2007 12:10:39 PM  
**Attachments:**

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**ISS On-Orbit Status 03/18/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 14 (CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin, FE-2 Sunita Williams). Ahead: Week 26 of Increment 14.*

The crew's work/sleep cycle has shifted another 2 hrs to the right and is now holding. Wake-up today: 8:00am, sleep time tonight: 11:30pm EDT. Tomorrow: 8:00am – 11:30pm. *[The change is in support of Soyuz 14S docking on 4/9 (~3:03pm EDT).]*

With the CDRA (Carbon Dioxide Removal Assembly) deactivated by ground control at ~11:00am EDT and no longer requiring active cooling, CDR Lopez-Alegria disconnected the bypass jumper from the LAB1D6 rack to the ITCS LTL (Internal Thermal Control System/Low Temperature Loop). *[CDRA was turned on yesterday in support of the SPHERES experiment, conducted as "Saturday Science" program.]*

Time again for recharging the Motorola-9505 Iridium satellite phone. FE-1 Tyurin took care of the monthly routine job. *[After retrieving it from its location in the Soyuz TMA-9/13S descent module (BO), Misha initiated the recharging of its lithium-ion battery, a 30-min. process, monitoring the process every 10-15 minutes as it takes place. Upon completion, the phone was returned inside its SSSP Iridium kit and stowed it back in the BO's operational data files (ODF) container. The satphone accompanies returning ISS crews on Soyuz reentry & landing for contingency communications with SAR (Search-and-Rescue) personnel after touchdown. The Russian-developed procedure for the monthly recharging has been approved jointly by safety officials. During the procedure, the phone is left in its fire-protective fluoroplastic bag with open flap.]*

Sunita Williams completed today's routine maintenance of the SM's SOZh system

(Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

Working off his Russian “job jar” discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

Also from the “time permitting” job list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A third suggestion for Misha’s choice was another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the SONY PD-150P camcorder to record color bloom patterns in the ocean, highly pronounced cloud cover anomalies, swirls, wakes of subsurface waves, water level drop, smoothing lanes in wave fields *[Uplinked target zones were the northern polar front area of the Atlantic Ocean, the coast of Africa and the Gulfstream with the mid-Atlantic Ridge area.]*

An additional voluntary job for Misha today: using the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

All crewmembers worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

At ~10:35am EDT, Suni Williams had her weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

L-A and Suni were thanked for yesterday’s SPHERES experiments and informed that the data collected from the “Saturday Science” activities will be used to support four different doctoral theses.

*Solar Eclipse Update:* The first solar eclipse of 2007 occurs tonight but will be visible only from eastern Asia and parts of northern Alaska. Greatest eclipse takes

place at 10:31:56 pm EDT (partial eclipse begins at 8:38:26 pm and ends at 12:25:00am. During this period the ISS will pass through the Moon's shadow once, on Daily Orbit 1 (DO1) and will consequently "lose" some photovoltaic power. For DO1, the cumulative sunlight available is 84% compared to the "no eclipse" case, i. e., available sunlight during this orbit will be 16% lower.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:46am EDT [= epoch]*):

Mean altitude -- 336.9 km  
Apogee height -- 346.6 km  
Perigee height -- 327.2 km  
Period -- 91.27 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0014412  
Solar Beta Angle -- -27.6 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 110 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47644

**Significant Events Ahead** (*all dates Eastern and subject to change*):

03/27/07 -- Progress M-58/23P undocking (from SM aft port, 2:07pm) & reentry  
03/29/07 -- Soyuz TMA-9/13S relocation (FGB nadir port to SM aft port, 6:25pm–6:53pm)  
04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15+VC12/Simonyi, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, ~3:03pm)  
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TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)  
TBD -- STS-117/13A docking  
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TBD -- STS-117/13A landing @ KSC  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
09/07/07 -- ATV (Automated Transfer Vehicle) launch (NET)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/17/07  
**Date:** Saturday, March 17, 2007 2:43:25 PM  
**Attachments:**

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**ISS On-Orbit Status 03/17/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams, except for regular maintenance and voluntary work.*

The crew's work/sleep cycle is shifting to the right, now in 2hr steps. Wake-up today: 6:00am, sleep time tonight: 9:30pm EDT. Tomorrow: 8:00am – 11:30pm. *[The change is in support of Soyuz 14S docking on 4/9 (~3:03pm EDT).]*

The crew conducted the regular weekly 3-hr task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, FE-1 Tyurin performed preventive maintenance/ servicing on RS (Russian segment) ventilation systems, cleaning Group A fans in the SM and the VD1 & VD2 fans in the DC1 Docking Compartment, and replacing the PS1 & PS2 ventilation filters in the FGB.

CDR Lopez-Alegria set up the regular ITCS LTL (Internal Thermal Control System/ Low Temperature Loop) coolant jumper connection to the LAB1D6 rack in support of ground-commanded activation of the U.S. CDRA (Carbon Dioxide Removal Assembly) at ~12:05pm EDT (for the subsequent CO<sub>2</sub>-producing SPHERES runs).

For today's voluntary "Saturday Science" program, Mike L-A and Sunita are setting up the hardware and are conducting Session 6 tests of autonomous operations & multi-body formation flying of two free-flying satellites within the cabin of ISS, as part of the SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites) investigation, utilizing two (of three) SPHERES satellites, five beacons on mounts, tanks, batteries etc. *[SPHERES demonstrates the basics of formation flight and autonomous docking, using beacons as reference for the satellites, to fly formation with or dock to the beacon. A number of programs define various incremental tests including attitude control (performing a series of rotations), attitude-only tracking, attitude and range tracking, docking with handheld and mounted beacons, etc. The payload consists of up to three self-contained 8-inch dia. free-floating satellites which perform the various algorithms (control sequences), commanded and observed by the crew members which provide feedback to shape algorithm development. Each satellite has 12 thrusters and a tank with CO<sub>2</sub> for propellant. The first tests, in May 2006, used only one satellite (plus two beacons – one mounted and one hand-held); a second satellite arrived on ULF1.1, the third on 12A.1. Formation flight and autonomous docking are important enabling technologies for distributed architectures.]*

FE-1 Tyurin worked on the Russian RSK1 laptop, saving photo images stored on it to a space HDD (hard disk drive) for return to the ground, in preparation for the loading of new software (for the PILOT experiment) scheduled on 3/21.

The CDR did the daily routine maintenance of the SOZh environmental control & life support systems in the SM, including ASU toilet facilities systems/replaceables.

After the reconstruction of the "water wall" in the Node from 20 CWCs (Contingency Water Containers), L-A today will also complete the weekly audit/inventory of the available CWCs and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

At ~9:10am, the crew had their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

At ~10:15am, Mikhail Tyurin had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

All crewmembers worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A copied Suni's, Misha's, and his own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his Russian discretionary "job jar" task list, the FE-1 performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also off the voluntary job list, Tyurin conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were **Yuri Gagarin's landing site** south of the town of Engels (located 4 km from the shore where the river bends to the west, at 45.98°East Longitude, 51.23°North Latitude {for Google Earth aficionados}), forest fires on the flood plain of the Volga River delta, the southern and western Aral coastline, Pamir glaciers west of the Fedchenko (the largest glacier in this era), Danube River delta lakes near Izmail, the Kerch Straits and Taman Peninsula, Mzmyta River from Adlerovski Airfield to the Krasnaya Polyana, the upper edge of the Main Caucasus Range, the Swiss Alps with glaciers near arch dams on the south slope of the valley to the east of lake Geneva, Allalin Glacier, and large islands in the Aegean Sea near the coast of Turkey.]*

A third discretionary task for FE-1 was to take photographs of two SKK removable cassette containers with exposed sample materials outside the ISS, SKK-9 on the SM Propulsion Compartment (through the VL1 window of the DC1, and SKK-2 on the DC1 (through SM window #6).

An additional voluntary job for Misha today: using the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

**Weekly Science Update** (*Expedition Fourteen -- 25<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* On 3/14, ALTCRISS spectrometer was re-oriented. Photos of new configuration were taken and PCMCIA card replaced. On 3/15, data since new orientation and photos would be downlinked. No report yet. Data and photos will be assessed upon receipt

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BASE:* Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA):* Complete.

*CBOSS (Cellular Biotechnology Support Systems):* Complete.

*CFE (Capillary Flow Experiment):* The CDR was thanked for sharing his Saturday time (3/10) with the ground team making quantifiable science that can be applied to any two phase tank design. The steps he completed operating the CFE ICF-1 (Interior Corner Flow 1) vessel were completed perfectly and produced excellent data for the investigators. "This was the first operation of ICF- and highlights why we need to perform the experiments and why it's called real-time ops. Each first time operation of a CFE vessel has led to changes, additions and deletions to the procedures. Your ops with ICF-1 joins that list and the procedure is being worked now to provide you another opportunity to operate ICF-1 if you so chose. We learned that the fluid is less sensitive to disturbances than expected, that the wait times can be reduced from 15 minutes to 3 minutes, and that the fluid relocation to the 'base of the container' is probably more efficiently accomplished by a crew identified centrifugal method". The CFE team has re-thought the entire procedure based on the flight ops and has generated updates to simplify, shorten and streamline the procedure. Words that conveyed excessive care not to disturb the container have been removed, and the pace for the entire procedure has been increased dramatically. "There is more action in the procedure now, less caution (with regard to fluid disturbances) and hopefully more fun for the crew. Remember, one of ICF1's features is that everything is repeatable and recoverable now that the first test has been completed".

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* Two student experiments. In progress.

*CULT (Cultural Factors Questionnaire):* Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test):* Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* Complete.

*EPO (Educational Payload Operation):* Complete.

*ETD (Eye Tracking Device):* Complete.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology):* Planned

*GRAVI (Threshold Acceleration for Gravisensing):* Complete.

*IMMUNO (Saliva Sampling):* Complete.

*LEUKIN:* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*NOA (Nitric Oxide Analyzer):* Complete.

*Nutrition:* Planned.

*PFE-OUM (Periodic Fitness Evaluation - Oxygen Uptake Measurement):* Planned for FE-2.

*PK-3 (Plasma Crystal 3):* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G):* Complete.

*RC (Refrigerated Centrifuge):* Planned.

*RS (Renal Stone):* Planned for CDR.

*SAMPLE:* Complete.

*SEM (Space Experiment Module):* Complete.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):*  
In progress.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Planned.

*TRAC (Test of Reaction & Adaptation Capabilities):* Four sessions were held successfully (3/9).

*TROPI (Study of Novel Sensory Mechanism in Root Phototropism):* Complete.

*YING (Yeast in No Gravity):* Complete.

*CEO (Crew Earth Observations):* Through 3/12 the ground has received a total of 5,876 of ISS/CEO images for review and cataloging. The crew was thanked for their recent excellent imagery for the Tenoumer and Middlesboro Impact sites, the Tigris-Euphrates Delta, and the Volga River Delta. Researchers will continue to ask for additional coverage of these two delta areas. A “magnificent” image of the Caravelas Strandplain on the coast of eastern Brazil will be published on NASA/GSFC’s Earth Observatory website this weekend. “It nicely illustrates the complex geomorphology of this area where dozens of ancient shorelines visible. Thanks for your keen eye for such beauties”.

Today's CEO (Crew Earth Observation) photo targets were **Stromboli Eruption** (*DYNAMIC EVENT: This island volcano, near 38.6N 15.0E, continues to erupt with reports of lava flows now reaching the sea. As ISS tracked southeastward down the Adriatic Sea E of the Italian Peninsula, the crew was to look obliquely right of track across Italy to the area just N of the eastern end of Sicily, documenting the height and extent of any plumes in the area*), **Mt. Kilimanjaro, Kenya** (*ISS had a nadir pass over this target. Although clouds in the area will likely obscure Nairobi, the crew was to look for the small ice fields and glaciers at the summit to be above the cloud layers. Center point is 3.00S 37.25E*), **Presqu’ile Impact Crater** (*this is a fairly large [24-km diameter] impact site in the boreal forest region of west-central Quebec province near 49.72N 74.80W. Because it is very ancient, at least 500 million years old, it has been heavily eroded and obscured. Much of what is visible and exposed in the area of Lac de la Presqu’ile which is located just S of the main E-W highway in the area passing S of the lumber town of Chapais. If they could spot this uniquely shaped lake [now frozen], try for context views of the lake and areas to the NW where more of the impact is thought to be*), and **Barringer Impact Crater** (*another nadir pass in fair weather and good light for this impact, trying again for an 800mm view*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 11:29am EDT [= epoch]):*

Mean altitude -- 337.0 km  
Apogee height -- 346.5 km  
Perigee height -- 327.5 km  
Period -- 91.27 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0014175  
Solar Beta Angle -- -32.2 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 40 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47631

**Significant Events Ahead** *(all dates Eastern and subject to change):*

03/27/07 -- Progress M-58/23P undocking (from SM aft port, 2:07pm) & reentry  
03/29/07 -- Soyuz TMA-9/13S relocation (FGB nadir port to SM aft port, 6:25pm–6:53pm)  
04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15+VC12/Simony, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, ~3:03pm)  
04/19/07 -- Soyuz TMA-9/13S undocking (SM aft, Exp.14+VC12/Simonyi) & land (6:11am/9:30am)  
TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)  
TBD -- STS-117/13A docking  
TBD -- STS-117/13A undocking  
TBD -- STS-117/13A landing @ KSC  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (SM aft port)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)  
07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation

08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
09/07/07 -- ATV (Automated Transfer Vehicle) launch (NET)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/16/07  
**Date:** Friday, March 16, 2007 1:27:50 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/16/07**

All ISS systems continue to function nominally, except those noted previously or below. *The crew has half a day off duty.*

The crew's work/sleep cycle has again started shifting to the right, now in 2hr steps. Wake-up today: 4:00am, sleeptime tonight: 7:30pm EDT. Tomorrow: 6:00am – 9:30pm. Sunday: 8:00am – 11:30pm. *[The shift is in support of Soyuz 14S docking on 4/9 (~3:03pm EDT).]*

On Day 5 of PMA-3 (Pressurized Mating Adapter 3)-related activities, concluding the job, CDR Lopez-Alegria and FE-2 Williams had 2.5 hrs each reserved for restowing the Node with equipment temporarily relocated due to the PMA-3 and ISL (Integrated Station LAN) activities. *[Stowage areas include the "water wall" with ~20 filled CWCs (Contingency Water Containers) and stowage racks with CTBs (Cargo Transfer Bags), mesh bags, etc. All moves needed to be tracked in the IMS (Inventory Management System), and the final configuration of the "water wall" was photo-documented.]*

Yesterday's troubleshooting by FE-2 of IWIS RSUs (Internal Wireless Instrumentation System/Remote Sensor Units) in the Russian segment (SM & FGB), attempting to get data downloaded via RF (radio frequency) transmission, was successful for the FGB RSU, but failed for the SM RSU. Williams got more troubleshooting time allotted today. *[Today's troubleshooting consisted of installing a 6-ft accelerometer extension cable in the SM RSU setup to allow better placement, then move it forward toward the Lab to improve radio transmission and take measurements of the signal strength. If not successful, next step will be to replace the SM RSU with a spare.]*

With the current SUBA (Onboard Equipment Control System) outfitting behind, FE-1

Tyurin worked on restarting the Elektron-VM oxygen (O<sub>2</sub>) generator, with the usual preceding nitrogen (N<sub>2</sub>) purge of the BZh-9 Liquid Unit and ground specialist tagup. *[Supported by tagup with the ground via S-band, Tyurin as usual monitored the external temperature of the secondary purification unit (BD) for the first 10 minutes of operation to ensure that there was no overheating. During nominal operations a gas analyzer is utilized to detect hydrogen (H<sub>2</sub>) in the O<sub>2</sub> line (which could cause overheating) but is not included in the control algorithm until 10 minutes after Elektron startup.]*

In the FGB (*Funktionalnyi-Grusovoi Blok*), Mikhail Tyurin supported the ground in troubleshooting the first of the six 800A storage batteries (whose temperature sensor has not shown any temperature indication).

Mike L-A performed the regular bi-monthly reboot of the OCA Router and File Server SSC (Station Support Computer) laptops.

After connecting the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable at the Lab RWS (Robotics Work Station), Suni Williams configured the SSRMS (Space Station Remote Manipulator System) with a Joint OCAS (operator commanded auto sequence) maneuver into proper position for video-covering the ground-controlled translation of the MT (Mobile Transporter) from WS-2 (Worksite 2) to WS-4 planned for 3/19 (Monday). *[The move to WS-4 is intended to reduce the surface area exposure of the TUS (Trailing Umbilical System) cable to potential MMOD (Micrometeoroid/Orbital Debris) strikes. The DCP power cable will be disconnected again later today.]*

L-A and Suni filled out their regular weekly FFQs (Food Frequency Questionnaires) on the MEC (Medical Equipment Computer), his 23<sup>rd</sup> and Suni's 12<sup>th</sup>, which keep a personalized log of their nutritional intake over time on special MEC software. *[The FFQ records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Misha performed another internal pressure check on the newly delivered BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator, to check for hermeticity. The unit was charged by him on 3/7 with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#21). *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

Working off his Russian "time permitting" job list, Tyurin performed the regular

checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also from the voluntary work list, Misha conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were mountain valleys on Taiwan, New Zealand, indications of a dust storm from the Aral Sea, the northern shore of Lake Issyk-Kul, forest fires in the alluvial plain and delta of the Volga River, and oil slicks on the Caspian Sea.]*

A third discretionary task item for the FE-1 is the periodic status check on the Rasteniya-2 payload. *[Rasteniya researches growth and development of plants under spaceflight conditions in the Lada-10 greenhouse.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (CDR, FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A copied Suni's, Misha's, and his own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Later today, the FE-2 will conduct her routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Also on today's timeline is for the CDR to complete another periodic atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries are to be replaced if necessary. *[CSA-CP measurements are to be gathered with the new 12A.1 units #1051 (prime) & #1044 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the*

*CDMK #2007 for CO<sub>2</sub> in SM (panel 449) and Lab, along with battery ticks. The instruments will be turned off afterwards, except for #1051, and returned to their regular locations.]*

At ~6:35am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~12:10pm, Sunita set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 12:15pm conducted a ham session with students at University School, Shaker Heights, Ohio. *[The boy's school's campus is located on 32 acres in Shaker Heights, an eastern suburb of Cleveland, Ohio. "Are there any fears that you got when you went to the ISS?"; "Would you ever bring your dog into space in an experiment or just to be with you?"; "Does music sound different in space?"; "How will this mission help promote future space expeditions?"; "Why do you wear white space suits?" ]*

At 1:05pm, L-A and Suni conducted a teleconference with ground specialists to discuss the "get-ahead" installation of ISL (Integrated Station LAN) equipment in the Lab and Airlock scheduled next week. *[ISL is an upgraded on-board LAN (Local Area Network) utilizing Ethernet connectivity over an ISL Router via cable or wireless (WAP/Wireless Access Point). ISL integrates all ISS "user" devices, eventually including RS (Russian segment) docking video distribution, payload comm & downlink (from IP modules, e.g., Columbus or JEM), crew operations, procedures viewing, email, IP phone, etc. ISL eliminates drag-through cables in hatches, will be up to ten times faster than the current OpsLAN, and has provisions for future modules. Its installation and transition were planned for Increment 15, but with the 13A slip some "get-ahead" tasks have now been moved to the current Increment, viz.: installation of ISL Router & "backbone" cabling in the Lab as well as ISL cabling in the Node (already completed) and Airlock. Lab, Airlock and ISL Router installations are scheduled for 3/12 (next Monday), 3/16, and the week of 3/19 through 3/23.]*

At ~5:10pm tonight, the crewmembers are to conduct their regular weekly tagup with the Lead Flight Director at JSC/MCC-H.

*"Saturday Science" Look-ahead:* For tomorrow's crew-discretionary "Saturday Science" program, Suni and L-A are planning to complete tests of autonomous operations & multi-body formation flying of two free-flying satellites within the cabin of ISS, as part of the SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites) investigation. The crew will conduct Session 6, utilizing two

(of three) SPHERES satellites, five beacons on mounts, tanks, batteries etc. *[SPHERES demonstrates the basics of formation flight and autonomous docking, using beacons as reference for the satellites, to fly formation with or dock to the beacon. A number of programs define various incremental tests including attitude control (performing a series of rotations), attitude-only tracking, attitude and range tracking, docking with handheld and mounted beacons, etc. The payload consists of up to three self-contained 8-inch dia. free-floating satellites which perform the various algorithms (control sequences), commanded and observed by the crew members which provide feedback to shape algorithm development. Each satellite has 12 thrusters and a tank with CO<sub>2</sub> for propellant. The first tests, in May 2006, used only one satellite (plus two beacons – one mounted and one hand-held); a second satellite arrived on ULF1.1, the third on 12A.1. Formation flight and autonomous docking are important enabling technologies for distributed architectures.]*

*Reboost Update:* Last night's station reboost by Progress 23P's aft rendezvous & docking thrusters was successful. Mean orbital altitude of the ISS was lifted by 5.1 km (3.2 s.mi.). The burn started at 10:47pm EDT and lasted ~12.5 min. With a nominal performance (within 2%), the maneuver produced a delta-V of 2.9 m/s (9.4 ft/s), boosting mean orbital altitude to 336.9 km, with 343.9 km apogee & 329.9 km perigee height of the slightly elliptical orbit.

Today's CEO (Crew Earth Observation) photo targets were **Ries Impact Crater** (*this 24-km diameter impact site is estimated to be only just over 15.1 million years old. It is located just north of the Danube River near 48.88N 10.62E or about midway between the major cities of Stuttgart and Munich. The interior of this site is almost entirely agriculture, but there is a hint of a roughly circular feature indicated by the remaining forested area. ISS had a nadir pass in fair weather*), **Afar Rift Zone, Ethiopia** (*station approach was from the NW down the Nile River Valley. During the approach the Ethiopian Highlands began left of track towards the Red Sea Coast. Geologists believe that this seismically active portion of the African Rift Valley System has the potential for cataclysmic change in the coming decades. The crew was to document baseline conditions of the positions and orientation of water bodies and geologic structures in a contextual mapping pass for future change comparisons. Center point is 13.0N 41.0E. Trying for a mapping strip just inland from the coast*), **Ile Rouleau Impact Crater** (*Lake Mistassini makes a large, distinct slashing arc in glacier-scarred terrain of the boreal forest of north central Quebec Province. On a tiny island near the SW end of the lake near 50.68N 73.88W is exposed a 4-km impact site nearly 300 million years old. As ISS approached the lake from the W, the crew was to aim right of track for the tear-drop shaped island, using the long lens settings for maximum detail. Mistassini is still frozen and there may be some snow present*), and **Santa Barbara Coast,**

**California** *(the crew has acquired good imagery of this LTER (Long Term Ecological Research) site area earlier in this Increment. In this nadir pass they were to try for a detailed mapping of the Santa Inez Mountains from just S of Lompoc to near Ojai. Center point is 34.50N 119.91W).*

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 9:01am EDT [= epoch]):*

Mean altitude -- 337.1 km  
Apogee height -- 349.1 km  
Perigee height -- 325.0 km  
Period -- 91.27 min.  
Inclination (to Equator) -- 51.62 deg  
Eccentricity -- 0.0017893  
Solar Beta Angle -- -36.6 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude gain in last 24 hours -- 5100 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47614

**Significant Events Ahead** *(all dates Eastern and subject to change):*

03/27/07 -- Progress M-58/23P undocking (from SM aft port, 2:07pm) & reentry

**[time added]**

03/29/07 -- Soyuz TMA-9/13S relocation (FGB nadir port to SM aft port, 6:25pm–6:53pm) **[time added]**

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15+VC12/Simony, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, ~3:03pm) **[time changed]**

04/19/07 -- Soyuz TMA-9/13S undocking (SM aft, Exp.14+VC12/Simonyi) & land (6:11am/9:30am)

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (SM aft port)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch (NET)

06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking (NET)

07/07/07 -- STS-118/13A.1 undocking (NET)  
07/12/07 -- STS-118/13A.1 landing (NET)  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
09/07/07 -- ATV (Automated Transfer Vehicle) launch (NET)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/15/07  
**Date:** Thursday, March 15, 2007 2:38:39 PM  
**Attachments:** [image001.jpg](#)

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### **ISS On-Orbit Status 03/15/07**

All ISS systems continue to function nominally, except those noted previously or below. *Caesar's bad day.*

Day 4 of PMA-3 (Pressurized Mating Adapter 3) activities for CDR Lopez-Alegria, in part assisted by FE-2 Williams, starting with opening of the Node port hatch. Since yesterday's leak checking of the new hatch window took longer than expected, installation of the PMS CBCS (Centerline Berthing Camera System) target and "Hyzod" window covers was deferred to today. Other crew activities were -

- removing the NPRV (Negative Pressure Relief Valve) from the Node port aft IMV (Intermodular Ventilation) flange on the bulkhead and installing two IMV caps instead;
- removing the standoff bars from the old center disk cover and transferring them to the new center disk cover (which has a hole/flap for the CBCS that is needed for Node 2 "Harmony" berthing);
- installing the new cover on the hatch door;
- performing a hatch seal inspection & checking that the PMA is empty of all stowage (except the BMRRM); and
- closing the Node port hatch.

Afterwards, the CDR depressurized PMA-3 to vacuum, monitoring the depress for the next two hours before completing the activities with cleanup ops. *[For the depress, L-A first moved stowed cargo from the Airlock's Crewlock (A/L C/L) to the Equipment Lock and connected the 35-ft VAJ (Vacuum Access Jumper) hose from the EMPEV (Emergency Manual Pressure Equalization Valve) at the inboard A/L IV hatch to the Node port hatch MPEV (Manual Pressure Equalization Valve), then activated the A/L depress pump (to reclaim PMA air for onboard use) and closed the IV hatch. The pump was powered off when C/L pressure reached ~103 mmHg. The remaining PMA pressure was then vented out via the Lab VRA (Vent & Relief Assembly). With yesterday's successful checkout of the Node Port CBM (Common*

*Berthing Mechanism) by MCC-Houston, PMA-3 is now ready for transfer to & mating at the Node's nadir port in the 13A.1 stage of Increment 15.]*

FE-1 Tyurin performed Part 2 of his 4<sup>th</sup> onboard Russian "PROFILAKTIKA" (MBI-8, "Countermeasures") preventive health maintenance fitness test series. *[Today's 2h 30 m fitness test was performed on the TVIS treadmill in unmotorized (idle) mode, with free choice of speeds within the range permitted. The test differs from the normal TVIS session by the use of the TEEM-100 gas analyzer (via a mask equipped with a pneumotachometer sensor), measurement of blood lactate level and subjective evaluation of physical exertion levels during the test. The lactate blood samples were taken twice at the end of the session, using the ACCUSPORT analyzer and REFLOTRON-4 accessories. Results were entered on a log sheet. TEEM and ECG (electrocardiograph) data were transferred to the RSE-Med laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]*

With the BITS2-12 onboard telemetry system turned off, Tyurin performed more outfitting on the BITS2-12 by installing three insert-cables on its BSK power switching unit behind panel 310 in the Service Module (SM) to power the onboard telemetry system's time sensor (DV2).

The Elektron oxygen (O<sub>2</sub>) generator remains switched off as TsUP/Moscow used several RGS (Russian ground site) comm passes today to test the PZU-A data storage unit (ROM-A, read-only memory A) installed yesterday by Misha on the BITS2-12 Central Processor system (PTsB), the cables connected today, and the DV2 timing device itself. Elektron will be powered up again tomorrow. Until then, cabin ppO<sub>2</sub> (partial pressure oxygen) is being maintained with stored gas from Progress 23P as required.

FE-2 Williams prepared for the next SLEEP sessions by saving data from the Actiwatches and then re-initializing the devices for herself and Mike L-A, before stowing them. The HRF-1 (Human Research Facility 1) rack was powered down later in the day. *[The NASA/JSC experiment is supported by the HRF1 laptop. To monitor the crewmembers' sleep/wake patterns and light exposure, their special Actiwatch device measure the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition.]*

The FE-1 finished the preparation, started on 3/13, of a U.S. water hose for potable water transfers by emptying the overnight disinfectant from the hose into a CWC (Contingency Water Container) receptacle and filling it with fresh potable water from the SVO-ZV tap, afterwards reconfiguring the water dispenser for nominal ops.

*[The water/disinfectant collected in the CWC will be used for flushing or, with Lab condensate added, processed in the SRVK-2M condensate water processor.]*

Tyurin serviced the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), downlinking the accumulated data of its spectrometer from its PCMCIA memory card plus the time of activation of the spectrometer to TsUP via OCA. *[ALTCRISS uses the AST spectrometer employed by VC8 guest cosmonaut Roberto Vittori in 2005 in the DC1 for the Italian LAZIO (Low Altitude Zone/Ionization Observatory) experiment.]*

Sunita Williams worked on the IWIS (Internal Wireless Instrumentation System), first downlinking (again) the dynamics data gathered with the newly installed IWIS RSUs (Remote Sensor Units) in the Russian segment (SM & FGB) of Tyurin's VELO exercise on 3/2, then performing a variety of setups of the radio-linked hardware to experiment with and verify signal strength. *[The recent automated IWIS download of the VELO data showed insufficient RF (radio frequency) signal strength between the FGB and Node RSUs. Purpose of Sunita's activities today was to investigate a number of possible contributing factors (such as stowage in the FGB "corridor", placement of the FGB RSU, orientation of the RSU antennas, etc.), using the IWIS software on an SSC (Station Support Computer) for signal strength readouts.]*

Mikhail Tyurin set up the hardware of the Russian PNEUMOCARD experiment and conducted the first session, using new software on the reconfigured RSE-Med A31p laptop and the TENSOPPLUS sphygmomanometer to measure arterial blood pressure. *[PNEUMOCARD has the purpose to acquire new scientific information to refine the understanding about the mechanisms used by the cardio respiratory system and the whole body organism to spaceflight conditions. By recording (on PCMCIA cards) the crewmember's electrocardiogram, impedance cardiogram, low-frequency phonocardiogram (seismocardiogram), pneumotachogram (using nose temperature sensors), and finger photoplethysmogram, the experiment supports integrated studies of (1) the cardiovascular system and its adaptation mechanisms in various phases of a long-duration mission, (2) the synchronization of heart activity and breathing factors, as well as the cardiorespiratory system control processes based on the variability rate of physiological parameters, and (3) the interconnection between the cardiorespiratory system during a long-duration mission and the tolerance of orthostatic & physical activities at the beginning of readaptation for predicting possible reactions of the crewmembers organism during their return to ground.]*

The crew conducted the periodic sampling of cabin air for subsequent analysis on the ground. *[Sunita started out by collecting samples with the GSC (Grab Sample Container) at the center of the SM and Lab, and Misha used the Russian AK-1M*

*adsorber to sample the air in the SM and FGB.]*

The FE-1 collected accumulated readings of the six Matryoshka-R Bubble Dosimeter detectors installed on 3/9 at various exposure locations in the RS. *[The six detectors now in use were positioned in the crew cabin on starboard & port, near SM window #6, plus close to the maintenance work table next to the Matryoshka's MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor panel.]*

Tyurin had another hour set aside to continue gathering trash & discarded equipment and transferring it to the cargo ship-turned-trash can for disposal stowage. *[23P will be jettisoned on 3/27.]*

At ~9:05am EDT, Sunita had a 15-min teleconference with ground specialists to discuss the images downlinked from her recent (3/7) Shuttle RPM (R-bar Pitch Maneuver) skill training. *[The skill training prepares the crew for the bottom side mapping of the Orbiter at the arrival of STS-117/13A. During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Orbiter, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

Williams also completed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Lopez-Alegria conducted the weekly audit/inventory of the available CWCs and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-2, FE-1/MBI-8), and RED resistive exercise device (CDR, FE-2).

Afterwards, Suni copied L-A's, Misha's, and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Misha serviced to the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, by taking the periodic photography of the setup with the Nikon-D1X camera, including the growth of the barley and pea seeds in the Lada-10

greenhouse. The images were then copied to the RSK1 laptop for subsequent downlink to TsUP-Moscow via BSR-TM or OCA. Working off his Russian "time permitting" discretionary task list, the FE-1 additionally performed the periodic status check on the Rasteniya-2 payload. *[Rasteniya researches growth and development of plants under spaceflight conditions in the Lada-10 greenhouse. The regular maintenance of the experiment (generally each Monday, Wednesday, Friday and Sunday) involves monitoring of seedling growth, humidity measurements, moistening of the substrate if necessary, topping off the water tank if ~20-25% of the total amount (4 liters) remains, and photo/video recording. Once weekly, data from the Lada greenhouse control unit are recorded on floppy disk for weekly downlink via REGUL-Packet or the new BSR-TM at a suitable occasion. Experiment purpose is the study of (1) plants cultivation technology ("Mizuna" lettuce, "Micro-Tom" dwarfish tomatoes, dwarfish (red) pea) as applied to standard greenhouse devices, (2) the impact of space flight factors on the growth and evolution of plants which can be potentially used in space vitamin greenhouses, (3) germination & viability of plants, (4) reproductive properties of plants, and production of the second generation of space seeds, (5) chemical composition of plants and seeds grown in zero-g conditions to define the content of nitrocompounds in vegetable biomass, etc.]*

Working off his Russian "time permitting" job list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/ temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also from the voluntary work list, Misha conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were forest fires in the alluvial plain and delta of the Volga River, oil slicks on the Caspian Sea, the coastline of the Big Aral Lake, Pamir glaciers west of the Fedchenko Glacier, the area from the Kerch Strait to the Krasnodar reservoir, the upper edge of the main Caucasus ridge, the Swiss Alps, with glaciers east of Lake Geneva, the Allalin Glacier, and coastline & islands in the Aegean Sea.]*

For the next "Saturday Science" program (3/17), plans are for Suni and L-A to complete tests of autonomous operations & multi-body formation flying of two free-flying satellites within the cabin of ISS, are part of the SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites) investigation.

**Reboost Update:** Tonight's station reboost is scheduled to **start at ~10:47pm**

**EDT.** Before that (~8:05am), attitude control authority will be handed over to the Russian MCS (Motion Control System) thrusters, commanded through the US-21 matching unit on the SM. The ISS, currently flying backwards, will be turned through approximately 180 deg, starting at ~8:10pm, to assume duty attitude for the reboost. The single burn will last ~12 min 30 sec and yield an expected 2.85 m/s delta-V. The reboost (with aft end thrusters) and yaw/pitch control (with yaw/pitch thrusters) will be done by 23P, while Progress 24P, with aft end thrusters inhibited, will handle roll control. Afterwards, ISS attitude will go to +XVV TEA (plus x-axis in velocity vector/torque equilibrium attitude), and attitude control will be returned to U. S. CMGs for momentum control at ~11:30pm.

Today's CEO (Crew Earth Observation) photo targets were **Mt. Kilimanjaro, Kenya** (*researchers are monitoring the tiny ice field and glaciers at the summit of this large East African volcano near 3.00S 37.25E. As ISS approached from the NW, the camera was to be aimed just left of track and try for detailed views*), **Tropical Cyclone Indlala** (*DYNAMIC EVENT: This slow-moving Category 3 tropical cyclone was forecast to be making landfall on the NE coast of Madagascar at the time of this pass near 6.0S 50.5E. As the station crossed the Mozambique Channel and approached the coast, the target was left of track for good views of this well-developed storm. Light was fading fast, but shadows should have enhanced the banding features and possibly the eye, if still present*), and **Barringer Impact Crater** (*the crew had a near-nadir pass over this small, isolated impact site just south of Interstate 20 near 35.03N 111.02W. They approached from the NW in clear weather and good light. ISS/CEO has already acquired an excellent view of this feature on 3/1 using the 400mm setting (see below). This time the crew was to try for an 800mm view*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:14am EDT [= epoch]*):

Mean altitude -- 332.2 km

Apogee height -- 346.0 km

Perigee height -- 318.3 km

Period -- 91.18 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.002064

Solar Beta Angle -- -40.8 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 137 m  
Revolutions since FGB/Zarya launch (Nov. 98) – 47597

**Significant Events Ahead** *(all dates Eastern and subject to change):*

03/15/07 -- ISS reboost (~10:47pm; delta-V~2.85 m/s)  
03/27/07 -- Progress M-58/23P undocking (from SM aft port) & reentry  
03/29/07 -- Soyuz TMA-9/13S relocation (FGB nadir port to SM aft port, start 6:28pm)  
04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, ~3:15pm)  
04/19/07 -- Soyuz TMA-9/13S undocking (SM aft port) & landing (6-9am)  
TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)  
TBD -- STS-117/13A docking  
TBD -- STS-117/13A undocking  
TBD -- STS-117/13A landing @ KSC  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking  
07/09/07 -- STS-118/13A.1 undocking  
07/12/07 -- STS-118/13A.1 landing  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
09/07/07 -- ATV (Automated Transfer Vehicle) launch (NET)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

*Barringer Impact Crater, Arizona (also known as Meteor Crater [CEO photo])*



0001401070

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 03/14/07  
**Date:** Wednesday, March 14, 2007 2:13:37 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/14/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, CDR Lopez-Alegria, FE-1 Tyurin & FE-2 Williams performed the Russian biomedical routine assessments of PZEh-MO-7/Calf Volume Measurement and PZEh-MO-8/Body Mass Measurement (6<sup>th</sup> time for Suni, 12<sup>th</sup> time for L-A and Mikhail), using the IM mass measurement device which Misha afterwards broke down for stowage.

Lopez-Alegria and Williams had ~3.5 hours scheduled for Day 3 of PMA-3 (Pressurized Mating Adapter 3) activities, starting with setting up, purging, then testing the pressure check equipment prior to its installation at the Node port hatch window to purge and leak check the latter, which required about 4 hrs of monitoring. Afterwards, the equipment was disassembled. *[There are more PMA-3-related tasks scheduled tomorrow and Friday.]*

After the window pressure check, Mike L-A installed the CBCS (Centerline Berthing Camera System) target assembly, with its glass lenses and mirror, on the PMA, thus readying the PMA for the mating to the Node nadir port in August. *[The target mirror's cover will be removed tomorrow before PMA-3 closeout.]*

Finally, L-A and Sunita reinstalled the four CPAs in the PMA-3 and closed the port hatch for the crew's sleep period after installing a protective cover on both sides of the new hatch window.

Having finished unloading Progress M-58/23P yesterday, the two Flight Engineers had several hours today to begin gathering trash & discarded equipment and to transfer it to the cargo ship-turned-trash can for disposal stowage. *[23P will be jettisoned on 3/27.]*

Tyurin completed a 2.5 hr session of Part 1 of his fourth onboard "Profilaktika" (MBI-8, "Countermeasures") preventive health maintenance fitness test series, starting with the VELO stationary cycle ergometer. *[Misha will do Part 2 of the test tomorrow (3/15) on the TVIS treadmill. Test procedure for MBI-8 is identical to the Russian MO-5 assessment, but in addition to the nominal procedure it uses the TEEM-100M gas analyzer with breathing mask, a blood lactate test with the ACCUSPORT analyzer and REFLOTRON-4 accessories, and a subjective evaluation of physical exertion levels during the test (using the Borg Perceived Exertion Scale, viz., 10 steps from very light over hard and very hard to maximum). Results are entered on a log sheet. TEEM and ECG (electrocardiograph) data are transferred to the RSE-Med Laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]*

With the Elektron oxygen (O<sub>2</sub>) generator switched off, then purged with N<sub>2</sub> on TsUP/Moscow Go-ahead, the FE-1 performed maintenance on the backup Central Processor system (PTsB) of the BITS2-12 onboard telemetry system, removing and replacing its PZU-A data storage unit (ROM-A, read-only memory A) with a new spare. *[The subsystem's PZU-B memory unit was replaced last year on 10/23.]*

Elektron will be powered up again on 3/16 (Friday). Until then, cabin ppO<sub>2</sub> (partial pressure oxygen) will be maintained with gas from Progress 23P storage as required.

Tyurin prepared the Russian RSE-Med computer, a ThinkPad A31p laptop, for future use by "ghosting" a new software load (vers. 1.3) on it from DVD, after first saving all its data collected during Increment 14 (STIMUL-01, Cardiocassette, etc.) on a PCMCIA card and later reading it in again.

The FE-1 also supported the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) by again changing the position of its ALS spectrometer, i.e., turning the instrument by 90 deg around its Y-axis and by 180 deg around the Z-axis so that its windows now face in the longitudinal (X-) direction of the Service Module (SM). The AST was then secured with Velcro and the new setup photographed with the Nikon D1X digital camera. *[The last position change was done on 2/15.]*

Between pressure checks of the Node port hatch window, Lopez-Alegria offloaded the Lab condensate tank to a CWC (Contingency Water Container, #1062). *[The procedure was estimated to take about 35 min, leaving a "stop quantity" of ~5.5 kg in the tank.]*

The FE-1 continued the preparation, started yesterday, of a U.S. water hose for potable water transfers by emptying the overnight disinfectant from the hose into a CWC and filling it with fresh disinfectant pumped manually from the EDV, to be left there for another 24 hours. *[The periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis in the KOV thermal loops' EDV container scheduled yesterday was not performed.]*

Sunita Williams performed the regularly scheduled inspection of the RED (Resistive Exercise Device) machine, inspecting the condition of the canister cords (every two weeks).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1/MBI-8).

Afterwards, Suni copied L-A's, Misha's, and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Tyurin completed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Misha also performed another internal pressure check on the newly delivered BZh Liquid Unit (#056) for the Elektron O<sub>2</sub> generator, to check for hermeticity. The unit was charged on 3/7 with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#21). *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing. A leaking BZh cannot be used.]*

In addition, the FE-1 updated/edited the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Working off his Russian "time permitting" job list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also from the voluntary work list, Misha conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were the largest island in the Volga River, mountain valleys on Taiwan, the northern shore of Lake Issyk-Kul, overlapping shots from the coast of the Sea of Azov to the Krasnodar reservoir, the upper edge of the main Caucasus ridge, forest fires in the Volga delta, and oil slicks on the Caspian Sea.]*

A third discretionary task for the FE-1 was the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse, and refilling the water tank as necessary.

Tomorrow's station reboost by Progress 23P is scheduled to start at ~9:50pm EDT. Before that, the ISS, currently flying backwards, will be flipped through 180 deg under CMG (Control Moment Gyro) control in another ZPM (Zero Propellant Maneuver), starting at ~8:10pm.

Today's CEO (Crew Earth Observation) photo targets were **Ries Impact Crater** (*this 24-km in diameter impact site is estimated to be only just over 15.1 million years old. It is located just north of the Danube River near 48.88N 10.62E or about midway between the major cities of Stuttgart and Munich. The interior of this site is almost entirely agriculture, but there is a hint of a roughly circular feature indicated by the remaining forested area. ISS had a nadir pass in fair weather*), **Stromboli Eruption** (*DYNAMIC EVENT: This strato-volcano is located on a small island just N of northeastern Sicily near 38.5N 14.9E. It has been erupting frequently since late February when two new craters opened near the summit. With the current fair-weather break, the crew was to try to document the extent of the volcanic plume. After crossing Sardinia they were to begin looking obliquely forward and left of track towards the area just NW of the "toe" of Italy*), and **Newfoundland Ice Floes** (*DYNAMIC EVENT: Bitter cold has gripped northeastern North America for several weeks now. Visible weather satellite imagery indicates that an extensive area of ice floes has developed in the Labrador Sea to the N and NE of Newfoundland, centered approximately near 52.0N 54.0W. As ISS approached the big island from the W-NW, the crew was to look obliquely left of track to document the extent and density of this sea-surface phenomenon*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 6:55am EDT [= epoch]):*

Mean altitude -- 332.3 km

Apogee height -- 346.3 km

Perigee height -- 318.4 km

Period -- 91.18 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020762

Solar Beta Angle -- -44.7 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 132 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47581

**Significant Events Ahead** *(all dates Eastern and subject to change):*

03/15/07 -- ISS reboost (~9:50pm; delta-V~2.6 m/s)

03/27/07 -- Progress M-58/23P undocking (from SM aft port) & reentry

03/29/07 -- Soyuz TMA-9/13S relocation (FGB nadir port to SM aft port)

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (FGB nadir port, ~3:15pm)

04/19/07 -- Soyuz TMA-9/13S undocking (SM aft port) & landing (6-9am)

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch

06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking

07/09/07 -- STS-118/13A.1 undocking

07/12/07 -- STS-118/13A.1 landing

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/15/07 -- Progress M-60/25P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch

08/18/07 -- Progress M-61/26P docking (DC1)

08/26/07 -- STS-120/10A -- Node 2 launch

08/28/07 -- STS-120/10A -- Node 2 docking

09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
09/07/07 -- ATV (Automated Transfer Vehicle) launch (NET)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/13/07  
**Date:** Tuesday, March 13, 2007 3:01:31 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/13/07**

All ISS systems continue to function nominally, except those noted previously or below.

Wake-up 2:00am EDT; sleep 5:30pm. *[EDT=GMT minus 4 hrs ("GMT minus 6 hrs" on 3/11 was in error.)]*

CDR Lopez-Alegria and FE-2 Williams had ~7 hours scheduled for today's PMA-3 (Pressurized Mating Adapter 3) activities (Day 2), starting with pressurizing PMA-3 and conducting a leak check prior to opening the Node port hatch leading into the adapter. *[There are three additional days of PMA-3 tasks scheduled for the crew.]*

After ingress, PMA-3 activities by the NASA crewmembers today included:

- Removing the Center Disk Cover *[a new cover, with a hole/flap for the CBCS (Centerline Berthing Camera System) will be installed on Day 4];*
- dismantling and removing all four CBM CPAs (Common Berthing Mechanism Controller Panel Assemblies);
- transferring all stowage items out of PMA-3 except for the spare P6 BMRRM (Bearing Motor Roll Ring Module) inside its bag *[transferred items included handrails, an ITCS IFHX (Interface Heat Exchanger), a DDCU (DC-to-DC Converter Unit), etc.]*
- removing the ECOMM (Early Communications) plate at the Node port hatch and replacing it with the original hatch window (the window on the Node starboard hatch was installed on Expedition 6);
- tying down the BMRRM with EVA & IVA tethers in the PMA to secure it for the relocation, and
- closing the PMA hatch.

FE-1 Tyurin, joined in part by FE-2 Williams, had several hours to continue unloading the Progress M-59/24P cargo ship, transferring & stowing equipment plus

keeping track of transfers in the IMS (Inventory Management System) for database updating.

To assure adequate air ventilation in the Soyuz TMA-9 spacecraft, Tyurin performed the monthly cleaning of the screen/grid of the BVN fan & air heater assembly in the Orbital Module of 13S.

The FE-1 continued past efforts to switch functions of the old EGE2 laptop and the new RSS2 A31p laptop by transferring the BSR-TM payload telemetry channel software to EGE2 and rebooting it for checkout.

Later, Mikhail collected the periodic cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

The FE-1 worked on preparing a U.S. hose for potable water transfers by starting a process of filling and disinfecting it between a Russian EDV container and a CWC (Contingency Water Container). Today, the disinfectant was pumped manually from the EDV into the hose, to be left there for 24 hours. Ground specialists were on standby for tagup if required.

Afterwards, Tyurin completed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh Liquid Unit where they could cause Elektron shutdown.]*

The FE-1 took care of the daily routine maintenance of the Service Module (SM)'s SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Tyurin also updated/edited the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise

device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A copied Suni's, Misha's, and his own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his Russian "time permitting" job list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also from the voluntary work list, Misha conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were the forest fires in the alluvial plain and delta of the Volga River, the coastal line of Big Aral Sea (western portion), the Swiss Alps with glaciers to the east of the Lake of Geneva, and the Allaline Glacier.]*

Today's CEO (Crew Earth Observation) photo targets were **Berlin, Germany** *(taking advantage of an unusual break in the European weather. Looking left of track for this largest city in the Northern European Plain centered near 52.50N 13.50E), Volga - Ural Delta* *(this extensive delta is situated on the NW coast of the Caspian Sea and centered near 46.0N 50.0E. It is a particularly dynamic feature due to ongoing sea level changes in the Caspian and tremendous human development of the Volga River watershed. As ISS approached the Caspian from the W-NW, the crew was to try for a seasonal contextual mapping of the coastal margins of the delta from W to E), Presqu'ile Impact Crater* *(this is a fairly large [24-km diameter] impact site in the boreal forest region of west-central Quebec province near 49.72N 74.80W. Because it is very ancient, at least 500 million years old, it has been heavily eroded and obscured. Much of what is visible and exposed is the area of Lac de la Presqu'ile which is located just S of the main E-W highway in the area passing S of the lumber town of Chapais. If the crew could spot this uniquely shaped lake [now frozen], they were to try for context views of the lake and areas to the NW where more of the impact is thought to be), and Caracas, Venezuela* *(the Venezuelan capital is situated inland from the coast near 10.47N 67.03W. The large city of Maracay to the west on Lake Valencia is usually mistaken for this target).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:35am EDT [= epoch]*):

Mean altitude -- 332.5 km  
Apogee height -- 346.3 km  
Perigee height -- 318.6 km  
Period -- 91.18 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0020661  
Solar Beta Angle -- -48.2 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in last 24 hours -- 126 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47565

**Significant Events Ahead** (*all dates Eastern and subject to change*):

03/15/07 -- ISS reboost  
03/27/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
03/29/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (SM aft port, 3:15pm EDT)  
04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) & landing (6-9am)  
TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)  
TBD -- STS-117/13A docking  
TBD -- STS-117/13A undocking  
TBD -- STS-117/13A landing @ KSC  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking  
07/09/07 -- STS-118/13A.1 undocking  
07/12/07 -- STS-118/13A.1 landing  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
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11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/12/07  
**Date:** Monday, March 12, 2007 2:35:59 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/12/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 25 of Increment 14.*

The crew's work/sleep cycle is on its planned 13-hour shift to the right, in one-hour steps. Wake-up last night: 12:00 midnight EDT; sleep: 3:30pm today. *[The shift will support the Soyuz 14S docking on 4/9 (~3:15pm EDT).]*

Beginning today for the crew: a busy week of PMA-3 (Pressurized Mating Adapter 3) operations, starting with stowage reshuffling & internal space reconfiguring. *[PMA-3 (vol. 5.2 m<sup>3</sup>) will be relocated in early August from the Node "Unity" port hatch to its nadir dock, making room at port for Node 2 on 10A/STS-120. Node 2 will be "parked" there only temporarily: after Shuttle departure PMA-2 (currently at Lab forward port) will be moved to the Node 2 fwd berth. Node 2 (vol. 70 m<sup>3</sup>) will then be transferred to the Lab fwd berth, - all supported by three Stage EVAs. ESA's "Columbus" will later attach at Node 2 stbd hatch, the Japanese JEM/"Kibo" at the port hatch, and MPLMs (Multipurpose Logistics Modules) in front.]*

CDR Lopez-Alegria and FE-2 Williams, in part assisted by FE-1 Tyurin for EDV transfers, worked in the Node, reconfiguring stowage from its P2 location to provide access to PMA-3. *[The stowage relocation also supports the planned ISL (Integrated Station LAN) installation activities and involves temporary removal of CWCs (Contingency Water Containers) to the Lab, permanent transfer of other items to new locations, and equipment assembly in the Node for ISL activities, while clearing access to the PMA-3 MPEV (Manual Pressure Equalization Valve) for PMA depress. Projected crew time for stowage preps: 5 hrs.]*

Later, Mike L-A and Sunita had 7 hrs between them to install ISL Ethernet cabling in the Node, broken down in three stages: (1) Forward (branching in Y-shape to port & starboard, behind panels), (2) routing on starboard, and (3) routing on port, which

provides ISL connectivity for six user interface ports (Ethernet jacks) in the Node and the Russian network. *[Projected future crew time requirements (3/16, 3-19-3/23): prep – 30 min; Lab cabling – 10 hrs; Airlock cabling – 2 hrs, ISL Router – 1.5 hrs.]*

FE-1 Tyurin meanwhile worked another ~2.5 hrs on unloading the Progress M-59/24P cargo ship, transferring & stowing equipment plus keeping track of transfers in the IMS (Inventory Management System) for database updating.

Afterwards, Mikhail worked on the BVN fan & air heater assembly for Progress 24 in the DC1 Docking Compartment, replacing its fan with a new unit. The old fan was prepacked for disposal.

Also in the “Pirs” module, the FE-1 performed Fire Detection System maintenance by dismantling its three IDZ-2 smoke detectors, cleaning their ionizing needles and then reinstalling the sensors.

The CDR handled today’s routine maintenance of the SM’s SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

The FE-2 updated/edited the standard daily IMS (Inventory Management System) “delta” file, which tracks equipment items & stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Mike L-A conducted the microbial (bacterial & fungal) “T+5 Day” analysis of air samples collected on 3/7 with the MAS (Microbial Air Sampler) kit in Lab, Node and SM. *[The sampling analysis is performed once per month for the first three months, and once every three months thereafter. Bacterial and fungal air samples are taken at two locations in each module. The colony growth on the sampling slides is analyzed after five days of incubation in four Petri dishes. For onboard visual analysis of media slides from SSK (Surface Sampling Kit), MCDs (microbial capture devices) from WMK (Water Monitoring Kit), coliform detection bags from MWAK (Microbial Water Analysis Kit), and Petri dishes from MAS, the crew has a procedure for visual inspection of samples for bacterial and fungal colony growths after appropriate incubation periods. Petri Dishes and SSK slides were stowed for return on 13A.]*

At 1:40pm EDT, Suni Williams performed the periodic VHF1 emergency communications check over NASA’s VHF (Very High Frequency) site at Wallops Island (AOS 1:43pm, LOS 1:50pm), talking with Houston/Capcom, MSFC/PAYCOM (Payload Operation & Integration Center Communicator) and Moscow/Glavni (TsUP

Capcom) in the normal fashion via VHF radio from a handheld microphone and any of the U.S. segment ATUs (audio terminal units). *[Purpose of the test is to verify signal reception and link integrity, and to ensure minimum required link margin during emergency and special events (such as a Soyuz relocation). Last time done: 1/3/07.]*

L-A did the standard weekly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), to check the condition of the roller bearings and record its time & date values.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A copied Suni's, Misha's, and his own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~9:10am EDT, Misha Tyurin used the video comm equipment to conduct a test session with the ground for an upcoming video downlink to the "CeBIT 2007" Exhibition in Hannover, Germany.

At ~10:50am, the CDR conducted a crew-discretionary personal teleconference via S- and Ku-band/video.

Working off his Russian "job jar" discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

Also from the "time permitting" job list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

As third job off the voluntary work list, Tyurin conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 mm focal length lens to take pictures of natural environment targets. *[Today's Uragan photo targets were the largest island on the Volga in nadir, the coastal line of Big Aral Sea, overlapping shots from the Azov Sea coast to*

*the Krasnodar water reservoir, the upper edge of the main Caucasus Ridge, oil slicks on the Caspian Sea, the coastal line of Greece, and islands in the Aegean Sea, in particular Lesbos near the Turkish shore.]*

An additional "free time" task item for Misha was the periodic check of the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the MATRYOSHKA-R payload in the DC1 Docking Compartment. *[The reader automatically records radiation readings at strictly defined times (:00, :15, :30, :45 minutes). The complex Matryoshka payload suite is designed for sophisticated radiation studies. The payload collects radiation measurements every 15 minutes of each hour around the clock. Note: Matryoshka is the name for the traditional Russian set of nested dolls, also called Babushka dolls when they are little old ladies ("grandmas").]*

Offloading the Lab condensate tank to a CWC is scheduled for 3/14 (Wednesday). *[Ground specialists are investigating why the USOS (US segment) has collected condensate water three times faster than expected over Thursday/Friday last week (~1.7 L/day versus expected 0.5 L/day).]*

On 3/19, the robotics MT (Mobile Transporter) will be translated back to WS-4 (Work Site #4) to reduce risk due to MMOD (Micrometeoroid/Orbital Debris) for the MT TUS (Trailing Umbilical System) cable.

A plan has been developed for improved tie-down of the spare BMRRM (Bearing Motor Roll Ring Module) at its current stowage location in the PMA-3 during the latter's planned relocation. Load analysis is underway.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
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**ISS Orbit** (as of this morning, 5:46am EDT [= epoch]):

Mean altitude -- 332.6 km

Apogee height -- 346.3 km

Perigee height -- 318.8 km

Period -- 91.18 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020479

Solar Beta Angle -- -51.2 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in last 24 hours -- 102 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47550

**Significant Events Ahead** (*all dates Eastern and subject to change*):

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03/27/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
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04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) & landing (6-9am)  
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06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
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06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking  
07/09/07 -- STS-118/13A.1 undocking  
07/12/07 -- STS-118/13A.1 landing  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/11/07  
**Date:** Sunday, March 11, 2007 1:35:38 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/11/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 14 (CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin, FE-2 Sunita Williams). Ahead: Week 25 of Increment 14. **Note:** Time changed to Daylight Saving this morning at 2:00am (i.e., EDT = GMT minus 6 hrs).*

The crew's work/sleep cycle is on its planned 13-hour shift to the right, in one-hour steps. Wake-up last night: 11:00pm EDT; sleep: 2:30pm today. *[The shift supports Soyuz 14S docking on 4/9 (~3:15pm EDT).]*

FE-1 Mikhail Tyurin completed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

As part of today's ECLSS maintenance, Tyurin also performed an internal pressure check on the new BZh Liquid Unit (#610056) for the Elektron oxygen (O<sub>2</sub>) generator, to check for hermeticity. The unit was charged on 3/7 with pressurized N<sub>2</sub> from the BPA Nitrogen Purge Unit (#21). *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing.]*

Working off his Russian "job jar" discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse. The water tank was to be refilled as required.

Also from the "time permitting" job list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian

TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A third suggestion for Misha's choice was another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the SONY PD-150P camcorder to record high production zones and associated oceanic phenomena in the Atlantic Ocean. March-April is the period of intensive blooming of Phytoplankton in the Northern Arctic front of the Atlantic and along the Black Sea waters. *[Uplinked target zones were the northern polar front area of the Atlantic Ocean, the coast of Africa and the Black Sea.]*

An additional voluntary job for Misha today: using the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography of environmental conditions for Russia's Environmental Safety Agency (ECON). *[KPT-3 photography has been a frequent earth observing experiment for ECON.]*

Also on his own time, Tyurin terminated the running ASN-M Satellite Navigation System data collection test, deactivating the ASN and its LT3 (Laptop 3) and configuring the gear for tear-down.

All crewmembers worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-1, FE-2), and VELO bike with bungee cord load trainer (FE-1).

At ~2:35am EDT, Mikhail Tyurin held a private telephone conference with officials of a Russian Election Committee.

At ~9:37am, Suni Williams had her weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

Special thanks were uplinked to Mike L-A for yesterday's successful "Saturday Science" program comprising CFE (Capillary Flow Experiment), during which he completed the first half of the ICF-1 (Internal Corner Flow 1) flight procedures. *["The experiments performed provide rare quantitative data of 3-D wicking in 'large' capillary containers that serve as models for spacecraft fuel tanks as well as other microgravity fluid systems. The results of the tests you performed have been downlinked to the ground for the PD team's observation and analysis. These results will be reviewed and will certainly be used to inform follow-on operations of the experiment. The team is very appreciative of your great work*

*on CFE!"]*

Sunita was thanked for downlinking via Ku-band, on her own time, the video made on 3/2 of Tyurin's exercise session on the VELO cycle ergometer which was measured for structural dynamic response with an IWIS RSU (Internal Wireless Instrumentation System/Remote Sensor Unit) set up in the FGB.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

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Eccentricity -- 0.0020511

Solar Beta Angle -- -53.6 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47534

**Significant Events Ahead** (*all dates Eastern and subject to change*):

03/15/07 -- ISS reboost

03/27/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/29/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (SM aft port, 3:15pm EDT)

04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) & landing (6-9am)

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking  
07/09/07 -- STS-118/13A.1 undocking  
07/12/07 -- STS-118/13A.1 landing  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
09/07/07 -- ATV (Automated Transfer Vehicle) launch (NET)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/10/07  
**Date:** Saturday, March 10, 2007 1:44:18 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/10/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams, except for regular maintenance and voluntary work. **Note:** Time change to Daylight Savings tomorrow at 2:00am (i.e., EDT = GMT minus 6 hrs).*

The crew's work/sleep cycle is on its planned 13-hour shift to the right, in one-hour steps. Wake-up last night: 11:00pm EST; sleep: 2:30pm today. *[The shift is being implemented to support the Soyuz 14S docking on 4/9 (~3:15pm EDT).]*

The crew conducted the regular weekly 3-hr task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, FE-1 Tyurin performed preventive maintenance cleaning on the SM ventilation system, today finishing up on cleaning Group B fans.

For today's voluntary "Saturday Science" program, Mike L-A set up the CFE (Capillary Flow Experiment) equipment in the Lab MWA (Maintenance Work Area) and performed the experiment, which took about 4 hrs. Afterwards, the hardware was torn down and stowed. *[CFE makes use of the station's micro-G environment to investigate the special dynamics of capillary flow, i.e., the interaction of liquid with solid that can draw a fluid up a narrow tube and can be exploited to control fluid orientation so that fluid systems on spacecraft perform predictably. L-A today did*

*the "Internal Corner Flow 1" portion of the CFE suite, a study of capillary flow through containers with complex interior corners. The results of CFE will have applications to management of liquid fuels, cryogenics, water-based solutions, and thermal fluids in spacecraft systems. The last CFE session was conducted by FE-2 Sunita Williams last Saturday (3/3). Today's was the seventh run aboard ISS.]*

The CDR also did the daily routine maintenance of the SOZh environmental control & life support systems in the SM, including ASU toilet facilities systems/replaceables.

All crewmembers worked out on their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A copied Suni's, Misha's, and his own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his Russian discretionary "job jar" task list, the FE-1 performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also off the voluntary job list, Tyurin conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 mm focal length lens to take pictures of natural environment targets. *[Today's Uragan photo targets were oil slicks on the Caspian Sea, the coastal line of Big Aral Sea, effects of dust storms from the Aral, the ice situation on Lake Baikal, islands in the Aegean Sea, in particular Lesbos, the Strait of Kerch and the eastern shore of the Azov Sea to the Krasnodar water reservoir, forest fires on the alluvial plain of the Volga River delta, and the upper edge of the main Caucasus Ridge in overlapping images.]*

A third discretionary task for FE-1 was the regular status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G greenhouse payload with peas and barley growths, and the recharge of its water tank.

An additional voluntary job for Misha today: using the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography

of environmental conditions for Russia's Environmental Safety Agency (ECON).  
[KPT-3 photography has been a frequent earth observing experiment for ECON.]

At ~12:07pm EST, Mike L-A had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

**Weekly Science Update** (*Expedition Fourteen -- 24<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Nothing to report. ALTCRISS performing nominally.

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BASE:* Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA):* Complete.

*CBOSS (Cellular Biotechnology Support Systems):* Complete.

*CFE (Capillary Flow Experiment):* Complete.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* Two student experiments. In progress.

*CULT (Cultural Factors Questionnaire):* Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test):* Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* Complete.

*EPO (Educational Payload Operation):* Complete.

*ETD (Eye Tracking Device):* Complete.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology):* Planned

*GRAVI (Threshold Acceleration for Gravisensing):* Complete.

*IMMUNO (Saliva Sampling):* Complete.

*LEUKIN:* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*NOA (Nitric Oxide Analyzer):* Complete.

*Nutrition:* Planned.

*PFE-OUM (Periodic Fitness Evaluation - Oxygen Uptake Measurement):* Planned for FE-2.

*PK-3 (Plasma Crystal 3):* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* Complete.

*POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G):* Complete.

*RC (Refrigerated Centrifuge):* Planned.

*RS (Renal Stone):* Planned for CDR.

*SAMPLE:* Complete.

*SEM (Space Experiment Module):* Complete.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* In progress.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Planned.

*TRAC (Test of Reaction & Adaptation Capabilities):* Four sessions were held successfully (3/9).

*TROPI (Study of Novel Sensory Mechanism in Root Phototropism):* Complete.

*YING (Yeast in No Gravity):* Complete.

*CEO (Crew Earth Observations):* Through 3/4 the ground has received a total of 5,315 of ISS/CEO images for review and cataloging. Researchers are currently reviewing the imagery of the Georgia Coastal Ecosystems, the Gulf of Fonseca, Cairo, Egypt and the Tenoumer Impact Crater. They hope to have feedback for the crew next week. “Your striking image of the Bahia Blanca area to the SW of Buenos Aires, Argentina will be posted on NASA/GSFC’s Earth Observatory website this weekend. Acquired last October, this image is enhanced by sun glint on the complex pattern of tidal channels and wetlands in the scene”.

Today's CEO (Crew Earth Observation) photo targets were **Eastern Tien Shan, China** (*this site is a very small glacier field located at the extreme eastern end of the rugged Tien Shan Mountain Range of northwest China near 43.15N 93.70E. Researchers initially need good context views of this area, so the crew was asked to use the short lens settings. The target was mostly left of track. As ISS approached the Tien Shan range from the W-NW the target area should have been on a narrow extension of mountains to the NE of the Takla Makan Desert*), **Hubbard Brook, New Hampshire** (*the Hubbard Brook Experimental Forest [HBEF] is a 3,160 hectare reserve located in the White Mountain National Forest of western New Hampshire, near 43.94N 71.75W. This Long Term Ecological research [LTER] site is on the western side of the N-S corridor of Interstate 93 about 10 miles northwest of Lake Winnepesaukee. Using the long lens for detail. Snow and ice may still be present*), and **Plum Island Ecosystem, MA** (*this target area is an LTER site on the northeastern coast of Massachusetts centered at 42.76N 70.89W. The island itself is a barrier island northwest of Gloucester. Requested was a detailed mapping of the estuaries and wetland behind the island, the island itself, and the near coastal waters. ISS had a near nadir pass. Ice and snow may still be present*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:45am EST [= epoch]*):

Mean altitude -- 332.8 km

Apogee height – 346.6 km

Perigee height -- 319.0 km

Period -- 91.19 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020532

Solar Beta Angle -- -55.3 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in last 24 hours -- 75 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47519

**Significant Events Ahead** *(all dates Eastern and subject to change):*

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03/27/07 -- Progress M-58/23P undocking (SM aft port) & reentry **(new date)**  
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TBD -- STS-117/13A undocking  
TBD -- STS-117/13A landing @ KSC  
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05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
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06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking  
07/09/07 -- STS-118/13A.1 undocking  
07/12/07 -- STS-118/13A.1 landing  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
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10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
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Late Oct/early Nov -- US EVA-10,-11,-12

11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/09/07  
**Date:** Friday, March 09, 2007 2:43:50 PM  
**Attachments:**

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**ISS On-Orbit Status 03/09/07**

All ISS systems continue to function nominally, except those noted previously or below.

The crew's work/sleep cycle has begun its planned 13-hour shift to the right, in one-hour steps. Wake-up last night: 10:00pm EST; sleep: 1:30pm today. *[The shift is being implemented to support the Soyuz 14S docking on 4/9 (~3:15pm EDT).]*

After setting up the necessary pump/hose plumbing, Tyurin performed another urine transfer from two filled EDV-U liquid waste containers to the BV2 water tank of the Progress 23P cargo ship-turned-trash can for disposal. Afterwards, Mikhail flushed the line with water, letting the compressor run at half speed for 4-5 minutes. *[Each of the two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before receiving the liquid waste.]*

With two ALTEA CNSM (Anomalous Long-Term Effects on Astronauts Central Nervous System Monitoring) sessions completed this week, CDR Lopez-Alegria today closed out the gear by deleting the old data files on the ER4 ELC (EXPRESS Rack 4 Laptop Computer) and restarting the experiment's DAU (Data Acquisition Unit) with the usual CPU (Central Processing Unit) lockup procedure for the untended radiation dosimetry. *[Both CNSM-helmet sessions were judged successful by the ground team, but Suni's data got truncated at the end by lack of disk space, perhaps due to insufficient deletion of previous data. Under investigation.]*

FE-1 Tyurin configured the BUBBLE dosimeter panel of the Russian radiation payload suite "Matryoshka-R", initializing six new detectors from stowage and positioning them in the RS (Russian segment). *[The dosimeter panel is attached*

*with Velcro at its Service Module (SM) work site (near the RBS 10/3 power outlet) and equipped with a fresh MMC memory card. The six detectors now in use are positioned in the crew cabin on starboard & port, near SM window #6, plus close to the maintenance work table next to the Matryoshka's MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor panel.]*

CDR Michael Lopez-Alegria worked on the ITCS (Internal Thermal Control System), removing the NiRA-1 (Nickel Removal Assembly 1) filter after first relieving its canister pressure via a spare ITCS CSA (Coolant Sampling Adapter), then replaced it with the new NiRA-2 unit. *[NiRA removes problematic nickel from the ITCS coolant in the LTL & MTL (Low Temperature & Moderate Temperature Loops). The NiRA-1 filter at the LAB105 Z-panel has been there since 1/15/07 (installed by L-A). Before its removal, the unit was allowed to equalize its temperature with the ambient air. NiRA-2 needs to be in place for at least 40 days and will be removed prior to 13A.1.]*

Sunita Williams removed the failed battery pack of the MELFI TDR (Minus-Eighty Laboratory Freezer for ISS/Temperature Data Recorder), installed a spare and performed a voltage check on the old battery. *[The TDR is crucial for monitoring MELFI science payloads as it provides temperature recording service for MELFI in the event of a planned or unplanned power-off.]*

With the untended testing of the Russian ASN-M Satellite Navigation System raw data collection and downloading ended today, Mikhail Tyurin closed down the data collect, copy and download application on Laptop 3, secured its data storage card and powered off the computer. The collected data were then copied to the OCA computer for downlink. *[ASN-M is required for the arrival of the European ATV (Automated Transfer Vehicle) "Jules Verne" later this year.]*

FE-2 Williams unstowed the spacesuit gloves worn by L-A and herself during the last EVA-8 and photographed them close up, front & back, for downlink. *[During ground inspection of STS-116/12A.1 MS Robert Curbeam's spacesuit, minor damage to his right EMU (Extravehicular Mobility Unit) glove was discovered, affecting its three outer layers (TMG/Thermal Micrometeorite Garment, RTV/Room Temperature Vulcanization material, and Vectran), most likely caused by a sharp edge. Today's imagery is intended to check on the readiness of L-A's and Suni's EMUs for the next EVAs.]*

In preparation for the relocation of the PMA-3 (Pressurized Mating Adapter 3) from the Node port hatch to the Node nadir hatch in August, Sunita worked in the U.S. Airlock (A/L), first moving stowed items out of the way, then conducting a fit check of the 35-ft VAJ (Vacuum Access Jumper) hose between the EL/CL (Equipment Lock/Crewlock) hatch PEV (Pressure Equalization Valve) and the Node portside

MEV (Manual Equalization Valve). *[The fit check was to verify that the jumper will reach the Node to allow use of the A/L depress pump in the EL for reclaiming the PMA-3's air prior to its final depressurization and leak check on 3/15, rather than having to vent it into space. The stowage relocation also served to clear access to A/L panels for installing ISL (Integrated Station LAN) cabling on 3/21 (see yesterday's Status report).]*

In preparation of the upcoming ISL outfitting, the FE-2 gathered necessary tools and equipment for the first installation step in the Node next week. At ~8:45am, the NASA crewmembers conducted a teleconference with ground specialists to discuss the Node ISL installation plan, scheduled for Monday (3/12). *[The Node ISL Ethernet Cable installation will provide connectivity between the Lab, A/L, RS, and a Node Interface Panel, to be launched on 25P. During the week of 3/19, the crew will install the Lab cabling, A/L cabling, a new Lab closeout panel and the ISL Router. ISL is an upgraded on-board LAN utilizing Ethernet connectivity over the Router via cable or wireless (WAP/Wireless Access Point). ISL integrates all ISS "user" devices, eventually including RS (Russian segment) docking video distribution, payload comm & downlink (from IP modules, e.g., Columbus or JEM), crew operations, procedures viewing, email, IP phone, etc. ISL eliminates drag-through cables in hatches, will be up to ten times faster than the current OpsLAN, and has provisions for future modules. Its installation and transition were planned for Increment 15, but with the 13A slip some tasks have now been moved to the current Increment.]*

Sunita also completed the periodic atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[CSA-CP measurements were gathered with the new 12A.1 units #1051 (prime) & #1044 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1003 for CO<sub>2</sub> in Service Module (SM) and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1051, and returned to their regular locations.]*

Mike L-A and Sunita filled out their regular weekly FFQs (Food Frequency Questionnaires) on the MEC (Medical Equipment Computer), his 22<sup>nd</sup> and Suni's 11<sup>th</sup>, which keep a personalized log of their nutritional intake over time on special MEC software. *[The FFQ records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and*

*vitamins. IBMP/Moscow (Institute of Biomedical Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value of the crew's food intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]*

L-A performed the regular bi-monthly reboot of the OCA Router SSC (Station Support Computer) laptop.

The CDR also did the daily routine maintenance of the SOZh environmental control & life support systems in the Service Module (SM), including ASU toilet facilities systems/replaceables.

The FE-2 updated/edited the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur)

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A copied Suni's, Misha's, and his own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Lopez-Alegria completed the weekly audit/inventory of the available CWCs (contingency water containers) and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

Working off his Russian discretionary "job jar" task list, the FE-1 performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also off the voluntary job list, Tyurin conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 mm focal length lens to take pictures of natural environment targets. *[Today's Uragan photo target was the ice situation on Lake Baikal.]*

A third discretionary task for FE-1 was the regular status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G greenhouse payload.

At ~4:05am EST, Tyurin linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Discussions today concerned the current whereabouts of the BNP #3 air pressurization bottle, the present stowage location of the new Elektron BZh Liquid Unit, delivered on 24P, and pre- & post-EVA-17A cargo relocations.]*

At ~4:20am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~11:45am, the crewmembers conducted their regular weekly tagup with the Lead Flight Director at JSC/MCC-H.

Yesterday's scheduled amateur radio session between Mike L-A and students of his former Mission Viejo High School, CA, did not come about due to an incorrect uplink frequency used by the ground station. At ~10:22am today, L-A had a second chance for the ham session.

Today's CEO (Crew Earth Observation) photo targets were **Volga-Ural Delta** (*this extensive delta is situated on the northwestern coast of the Caspian Sea and centered near 46.0N 50.0E. It is a particularly dynamic feature due to ongoing sea level changes in the Caspian and tremendous human development of the Volga River watershed. As ISS approached the Caspian from the W-NW, the crew was to try for a seasonal contextual mapping of the coastal margins of the delta from W to E*), **Harvard Forest, Vermont** (*the Harvard Forest is an LTER [Long Term Ecological Research] site located in a rural setting in north-central Massachusetts about 70 miles W of Boston near 42.54N 72.17W. The 1200-hectare site lies in the Transition Hardwood-White Pine-Hemlock forest region, and includes a variety of forests and wetlands. Aiming for the shape Quabbin Reservoir as the station approached from the SW. It is probably still frozen. Just the target area is roughly defined by the triangle formed by the towns of Petersham, Athol, and Orange. Using the long lens for a detailed mapping of this area, especially just NW of Petersham*), and **Presqu'île Impact Crater** (*this is a fairly large [24-km in diameter] impact site in the boreal forest region of west-central Quebec province near 49.72N 74.80W. Because it is very ancient, at least 500 million years old, it has been heavily eroded and obscured. Much of what is visible and exposed in the area of Lac de la Presqu'île which is located just S of the main E-W highway in the area passing S of the lumber town of Chapais. If the crew could spot this uniquely shaped lake [now frozen], they were to try for context views of the lake and areas to*

*the NW where more of the impact is thought to be.)*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

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Perigee height -- 319.2 km

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Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020274

Solar Beta Angle -- -56.1 deg (magnitude peaking)

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Mean altitude loss in last 24 hours -- 162 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47503

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04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (SM aft port, 3:15pm EDT)

04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) & landing (6-9am)

TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

TBD -- STS-117/13A docking

TBD -- STS-117/13A undocking

TBD -- STS-117/13A landing @ KSC

TBD -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port) -- depends on 13A

TBD -- SM reboost engine test (depends on 13A)

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch

06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking

07/09/07 -- STS-118/13A.1 undocking

07/12/07 -- STS-118/13A.1 landing

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
09/07/07? -- ATV (Automated Transfer Vehicle) launch (NET)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/08/07  
**Date:** Thursday, March 08, 2007 2:23:23 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/08/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-1 Mikhail Tyurin serviced the Russian Harmful Impurities Removal System (BMP), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The bake-out was terminated at ~12:15pm EST. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

FE-2 Sunita Williams performed the periodic two-hour water analysis protocol for the current week (24) by collecting samples of potable water for chemical and microbial analysis from the SVO-ZV tap and the SRV-K warm tap, the latter after preliminary heating of the water and flushing. *[From each port, Sunita collected two 750 mL chemical archival (post-flight) samples for return to Earth on 13A, and two 225 mL microbial samples for inflight processing, using CDBs (Coliform Detection Bags) and MCDs (Microbial Capture Devices). Two heating cycles were required to complete this sampling session.]*

CDR Michael Lopez-Alegria worked on the ITCS (Internal Thermal Control System) for 24-hr. temperature equalization of its NiRA-1 (Nickel Removal Assembly) filter preparatory to its replacement, then took pre-removal ITCS fluid samples for return to the ground. *[NiRA removes problematic nickel from the ITCS coolant in the LTL & MTL (Low Temperature & Moderate Temperature Loops). The NiRA-1 filter at the Z-panel has been there since 1/15/07 (installed by L-A). It will be removed tomorrow for return on 13A and replaced with NiRA-2.]*

FE-1 Mikhail Tyurin did the daily routine maintenance of the SOZh environmental control & life support systems in the Service Module (SM), including ASU toilet facilities systems/replaceables and today also the periodic (monthly) replacement of

the toilet's urine receptacle (MP) and filter insert (F-V), stowing the old units for disposal. (Last time done: 2/5).

Later in the day, the FE-1 updated/edited the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur)

After CDR Lopez-Alegria's ALTEA-CNSM (Anomalous Long-Term Effects on Astronauts-Central Nervous System Monitoring) session yesterday, the NASA crewmembers continued their work with the experiment, restarting its DAU (Data Acquisition Unit) with the usual CPU (Central Processing Unit) lockup procedure, deleting yesterday's data from the CNSM laptop, and configuring CNSM cabin dosimetry instrumentation. FE-2 Williams donned the brain electrode helmet today for her session. *[Background: ALTEA measures details about cosmic radiation and its interactions with Astronauts' central nervous system. This involves CNS measurements with a 32-channel EEG (electroencephalograph) of the crewmember, plus accurate long-term real-time particle flux dosimetry (DOSI mode) inside the ISS with six particle detectors (originally introduced on Mir). A specific focus of CNSM is on abnormal visual perceptions (such as the often reported phosphenes, - "light flashes", with eyes closed) and the impact of particles on brain functions in micro-G. For comparison, brain stimulation is also done with "known" optical signals (with eyes open). Subjects record their perceptions with a pushbutton device. ALTEA equipment can be used separately or in any combination, permitting several different experiments: in physics, dosimetry, psychophysics, electrophysiology and cognitive neurophysiology. The NASA-sponsored ALTEA-CNSM, developed by the Italian Space Agency(ASI) and the Italian firm Alenia Spazio, is assigned to Increments 13, 14 and 15. Its predecessor ALTEINO was performed on ISS in April 2002 by Roberto Vittori during his Soyuz taxi mission. Principal Investigator Livio Narici to crew: "Please try to stay awake during the session."]*

The three station residents completed another run, their fourth, with the NASA-sponsored German/Canadian experiment TRAC (Test of Reaction & Adaptation Capabilities). As before (3/2), Sunita Williams set up the video gear and assembled the TRAC hardware in the work area (i.e., laptop, joystick, headphones, and time box). Afterwards, Sunita, Mikhail and L-A performed their individual data take sessions. Later, the last one (CDR) closed out and stowed the equipment. *[TRAC tests the idea that the decrease in motor skills reported by some astronauts (for example, hand-eye coordination), is due to the brain adapting to being in space. By testing hand/eye coordination of crewmembers, scientists hope to test the theory that while the brain is adapting its sensory-*

*motor functions to space it is unable to fully provide the resources necessary to perform normal manual skills, i.e., the data will be used to show that adaptation to zero-G draws on resources normally used for computational tasks, for example. Crewmembers test their hand-eye coordination prior to the mission, while on orbit and then again when they have returned to Earth. TRAC hardware includes a laptop mounted to a table and a joystick to control the cursor on the PC screen. Also used are audio headphones and a reaction time box to respond to audio and visual stimuli. For the test the crewmember is sitting on the floor of the Lab module, with legs restrained and the work table on the legs.]*

After yesterday's replacement of the old TORU "Simvol-Ts" color television monitor (IT-Ts) with a new LCD/liquid-crystal display monitor (IT-ZhK), FE-1 Tyurin had 1.5 hrs. reserved for testing the IT-ZhK and its new data generation unit (BFI-B) which replaced the previous rendezvous parameter output control unit (BUVK-Ts). Tests were both ground-controlled (during RGS/Russian Ground Site comm passes) and by using the TV camera onboard the Soyuz spacecraft (outside RGS). *[The new LCD display is part of the ATV (Automated Transfer Vehicle) prox ops equipment (PCE), to be used for monitoring ATV arrival and docking.]*

At the HRF1 (Human Research Facility 1) rack, Mike L-A deactivated the MedOps cardiac defibrillator and afterwards conducted its periodic checkout. (Last time done: 1/17/07). *[This periodic routine task is scheduled as soon as possible from Expedition start and every 60 days thereafter. For the checkout, the defib is connected to the 120V outlet, equipped with its battery and then allowed to charge, for about five seconds, to a preset energy level (e.g., 100 joules). After the button-triggered discharge, a console indicator signals success or failure of the test. The pacing signal is downlinked via S-band for 2 min. The HRF was afterwards powered down.]*

Misha Tyurin, assisted by L-A, conducted the periodic (monthly) functional closure test of a spare emergency vacuum valve (AVK) for the Vozdukh CO<sub>2</sub> removal system, in the spare parts kit. *[The AVKs are critical because they close the Vozdukh's vacuum access lines in the event of a malfunction in the regular vacuum valves (BVK) or a depressurization in the Vozdukh valve panel (BOA). Access to vacuum is required to vent carbon dioxide (CO<sub>2</sub>) during the regeneration of the absorbent cartridges (PP). During nominal operation, the AVK valves remain open.]*

L-A performed the periodic CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout on the prime unit (#1051) and backup unit (#1044), planned for 3/6. *[L-A changed out the prime unit's battery, then zero-calibrated both instruments. Following zero calibration, the backup unit was stowed,*

*while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

Tyurin completed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown.]*

Working off his Russian discretionary "job jar" task list, the FE-1 performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also off the voluntary job list, Tyurin conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were volcanoes on Kamchatka, Pamir glaciers (in nadir), the northern shore of Lake Issyk-Kul, ice on Lake Baikal, coastal regions of Greece, the Isle of Lesbos in the Aegean Sea near the Turkish shore, Taman and the eastern Azov Sea, forest fires on the alluvial plain of the Volga River, and the northern coast of the Aegean.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A copied Suni's, Misha's, and his own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:00am EST, the two Flight Engineers downlinked two PAO TV messages of greetings to children events in Russia, one to the Young Cosmonauts Club in Rostov-on-Don, which is a series of meetings dedicated to the anniversaries of K.E. Tsiolkovsky, S.P. Korolev, and the 50<sup>th</sup> Anniversary of Sputnik 1, the other to participants at Artek Camp on the Crimean on the camp theme "Artek Space Odyssey". A third message of felicitations was sent down by Mikhail Tyurin to the

Head Customer Office at RSC-Energia on its 60<sup>th</sup> anniversary.

At ~11:30am, L-A set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 11:35am conducted a ham session with students at Mission Viejo High School, CA, which he once attended. *[Mission Viejo High School, a comprehensive high school servicing students grades 9-12, is one of five high schools in the Saddleback Valley Unified School District and the first in the district, with first classes admitted in 1966. "What is your favourite memory from Mission Viejo High School?"; "What made you interested in becoming an astronaut?"; "How do you feel waning public interest in space exploration has affected NASA's programs and space missions?"; "As a fellow scholar in the science of the heavens, what advise would you have as far as education is concerned during my collegiate career?"; "When you return from your current mission, will you please come back and visit Mission Viejo HS?" ]*

***UCCAS-1 Testing Update:*** Russian attitude control thrusters were inhibited from 4:15am to 5:50am in support of the UCCAS-1 (Unpressurized Cargo Carrier System 1) testing from MCC-Houston. UCCAS, to be used for 13A.1 cargo stowage on the P3 truss (zenith), was deployed during EVA-8 on 2/8 by L-A and Suni. *[Today's test was a full functional post-EVA deployment checkout of the CLA (Capture Latch Assembly) and movable UMA (Umbilical Mechanism Assembly) for UCCAS-1 site, comprised of driving each latch on both MBS IMCAs (Mobile Base System/Integrated Motor Controller Assemblies) open and closed, then left fully open, and moving the UMA out and back on both IMCAs, to remain fully demated. In this final configuration UCCAS-1 will be ready for the mating of the new ESP-3 (External Stowage Platform 3) arriving on Flight 13A.1.]*

***ASN-M Testing Update:*** The ground-controlled testing of the ASN-M Satellite Navigation System equipment raw data collection and downloading continues, to be terminated tomorrow (3/9). *[ASN-M is required for the arrival of the European ATV (Automated Transfer Vehicle) "Jules Verne" later this year.]*

***ISL Preview:*** During the next two weeks, the crew will be performing major activities around the planned installation of the extensive ISL (Integrated Station LAN/Local Area Network). ISL is an upgraded on-board LAN utilizing Ethernet connectivity over an ISL Router via cable or wireless (WAP/Wireless Access Point). ISL integrates all ISS "user" devices, eventually including RS (Russian segment) docking video distribution, payload comm & downlink (from IP modules, e.g., Columbus or JEM), crew operations, procedures viewing, email, IP phone, etc. ISL eliminates drag-through cables in hatches, will be up to ten times faster than the current OpsLAN, and has provisions for future modules. Its installation and transition were planned for Increment 15, but with the 13A slip some tasks have now been moved to the current Increment, viz.: installation of ISL Router &

“backbone” cabling in the Lab as well as ISL cabling in the Node and Airlock (A/L). After a one-hour ISL preparatory conference tomorrow, these tasks are scheduled for 3/12 (next Monday), 3/16, and the week of 3/19 through 3/23.

**Node/PMA-3 Destow Preview:** In the days ahead, the crew also needs to rearrange/relocate stowed equipment, first clearing out Node stowage that is blocking access to PMA-3 (Pressurized Mating Adapter 3) and panels that must be accessed for installing ISL cables, later partially emptying PMA-3 (used currently to alleviate part of the stowage problem on board) so that it can be relocated to its new position in August this year.

Today's CEO (Crew Earth Observation) photo targets were **Red River Basin, TX** (*ISS had a nadir pass over the target where the interest is land use change and human impacts. The center point is 34.25N 98.0W. Trying for a west to east mapping of meandering Lake Texhoma, about 80 miles north of the Dallas-Fort Worth area*), **Charlevoix Impact Crater** (*this heavily weathered impact site is situated on the NW side of the St. Lawrence River near 47.53N 70.30W or about 45 miles NE of the city of Quebec. 42-km in diameter and approximately 342 million years old, it remains as a bulge on the northwest shore of the river estuary. Looking right of track and using the long lens for detail*), and **Ile Rouleau Impact Crater** (*Lake Mistassini makes a large, distinct slashing arc in glacier-scarred terrain of the boreal forest of north central Quebec Province. On a tiny island near the southwestern end of the lake near 50.68N 73.88W is exposed a 4-km impact site nearly 300 million years old. As ISS approached the lake from the W, the crew was to aim right of track for the tear-drop shaped island, using the long lens settings for maximum detail. Mistassini is still frozen and there may be some snow present*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:41am EST [= epoch]*):

Mean altitude -- 333.0 km

Apogee height – 346.6 km

Perigee height -- 319.5 km

Period -- 91.19 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020197

Solar Beta Angle -- -56.1 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 135 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47488

**Significant Events Ahead** *(all dates Eastern and subject to change):*

04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (SM aft port, 3pm)  
04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) & landing (6-9am)  
TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)  
TBD -- STS-117/13A docking  
TBD -- STS-117/13A undocking  
TBD -- STS-117/13A landing @ KSC  
TBD -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port) –  
depends on 13A  
TBD -- SM reboost engine test (depends on 13A)  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking  
07/09/07 -- STS-118/13A.1 undocking  
07/12/07 -- STS-118/13A.1 landing  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
09/07/07? -- ATV (Automated Transfer Vehicle) launch (NET)  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 03/07/07  
**Date:** Wednesday, March 07, 2007 1:57:25 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/07/07**

All ISS systems continue to function nominally, except those noted previously or below.

FE-1 Mikhail Tyurin performed the periodic regeneration of the Russian Harmful Impurities Removal System (BMP) by starting the "bake-out" cycle to vacuum on absorbent bed #1 of the dual-channel filtration system. The bake-out was terminated at ~10:00am EST. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

Using the MAS (Microbial Air Sampler) kit, CDR Michael Lopez-Alegria collected air samples in Lab, Node and Service Module (SM) for bacterial and fungal analysis. *[The sampling analysis is performed once per month for the first three months, and once every three months thereafter. Bacterial and fungal air samples are taken at two locations in each module. The colony growth on the sampling slides will be analyzed after five days of incubation in 4 Petri dishes. For onboard visual analysis of media slides from SSK (Surface Sample Kit), MCDs (Microbial Capture Devices) from WMK (Water Monitoring Kit), coliform detection bags from MWAK (Microbial Water Analysis Kit), and Petri dishes from MAS, the crew has a procedure for visual inspection of samples for bacterial and fungal colony growths after appropriate incubation periods.]*

Meanwhile, FE-2 Sunita Williams collected collect surface sample swabs in Lab and Node for cultivation/incubation with the EHS (Environmental Health Systems) SSK. *[As done for MAS, SSK sampling is performed once per month for the first three months that a module is on orbit and once every three months thereafter. Bacterial and fungal samples are taken at two locations in each module, with the prime site in the Lab being the air supply diffuser at the LAB1P5 rack. The colony growth on the 10 sampling slides will be analyzed after five days of incubation.]*

Tyurin set up the ASN-M Satellite Navigation System equipment, connected to the Russian payload Laptop 3 (running the Solaris Operating System), and started the raw data collection application on the laptop, testing various script files. Support was provided by ground specialist tagup via S-band. The test will be run by TsUP/ Moscow and ESA (European Space Agency)/Oberpfaffenhofen for the next two days, to be terminated on Friday (3/9). *[ASN-M is required for the arrival of the European ATV (Automated Transfer Vehicle) "Jules Verne" later this year.]*

FE-2 Williams completed a checkout of the MSS AVUs (Mobile Service System Artificial Vision Units) at the Lab and Cupola RWS (Robotics Work Station), after connecting the UOP DCP (utility outlet panel/display & control panel) bypass power cable at both sites, later in the day taking it down again.

Mike L-A and Sunita prepared the ALTEA-CNSM (Anomalous Long-Term Effects on Astronauts-Central Nervous System Monitoring) equipment for tomorrow's planned experiment session for both of them. *[The crewmembers set up the gear, deactivated the ALTEA DOSI (passive dosimeter) mode, restarted the experiment's DAU (Data Acquisition Unit) with the usual CPU (Central Processing Unit) lockup procedure, and readied the video equipment. Afterwards, L-A cleared the CNSM laptop of earlier data, configured CNSM dosimetry instrumentation and ran a functionality test on the CNSM hardware while Suni took historical/documentary photography of the setup. The hardware was then deactivated and the test data transferred for downlinking. Purpose of ALTEA is to define and measure descriptors for the electrophysiological brain functioning and to follow their dynamics, correlating it with space environments. Purpose of ALTEA is to define and measure descriptors for the electrophysiological brain functioning and to follow their dynamics, correlating it with space environments. This involves CNSM measuring sessions by crewmembers wearing a brain electrode helmet for taking a 32-channel EEG (electroencephalograph), plus long-term unmanned real-time particle flux dosimetry (DOSI mode) inside the ISS. A specific focus of CNSM is on abnormal visual perceptions (such as the often reported phosphenes, - "light flashes") and the impact of particles on brain functions in micro-G. ALTEA uses six particle detectors (originally introduced on Mir), the EEG helmet, a visual stimulator and a pushbutton. These devices can be used separately or in any combination, permitting several different experiments: in physics, dosimetry, psychophysics, electrophysiology and cognitive neurophysiology.]*

The crew conducted the regular fire drill/OBT (on-board training), a mandatory periodic one-hour exercise (including debrief). Primary goal of this Russian-led interactive exercise is to provide the station residents with the most realistic emergency training possible. The drill is always conducted with the support of both MCCs in close coordination. It should be performed every 2.5 months, but not later than 1 month prior to end of Increment. *[OBT objectives are to (a) practice fire*

*response procedures (FRPs) and all incorporated actions for the case of a software-detected fire to locate, extinguish, and verify extinguishing attempts; (b) browse through RS laptop and the Signal-VM fire detection system displays as well as the automated software (algorithms) response to the fire event; (c) practice crew communication necessary to perform emergency FRPs; (d) update the locations of support hardware (CSA-CP compound specific analyzer-combustion products, IPK-1M gas masks and OSP-4 fire extinguishers to be used for fire suppression in the FGB). These exercises do not actually use any fire equipment but simulate such actions to the maximum extent possible. The Emergency Procedures OBT concluded with a 15-min. debrief with Russian/U.S. ground specialists at ~3:05am EST via S-band.]*

Sunita Williams went through the standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, using her DCS-760 digital still camera with 400 & 800mm lenses at SM windows 6 & 8 to take imagery of documented Earth targets using manual focusing only. Later (~3:25am EST), Sunita downlinked the obtained images to the ground for analysis. The skill training prepares the crew for the bottom side mapping of the Orbiter at the arrival of STS-117/13A. *[During the RPM at ~600 ft from the station, the ISS crew will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Orbiter, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

Working in the SM on the TORU manual teleoperator control equipment, Tyurin disconnected the old "Simvol-Ts" color television monitor (IT-Ts) with its associated rendezvous parameter output control unit (BUVK-Ts) and replaced it with a recently delivered modern LCD/liquid-crystal display monitor (IT-ZhK).

Lopez-Alegria and Williams conducted the MedOps WinSCAT (Spaceflight Cognitive Assessment Tool) experiment by logging in on the MEC (Medical Equipment Computer) and performing the psychological evaluation exercise on the laptop-based WinSCAT experiment (L-A's fifth {plus one repetition}, Suni's second). *[WinSCAT is a time-constrained questionnaire test of cognitive abilities, routinely performed by astronauts aboard the ISS every 30 days before or after the PHS (periodic health status) test or on special CDR's, crewmembers or flight surgeons request.]*

Mike L-A performed the standard checkup of the CGBA-4 (Commercial Generic Bioprocessing Apparatus #4) payload, set up by Suni on 12/15/06. *[CGBA comprises two educational experiments to be utilized by middle school students. One experiment examines seed germination in micro-G including gravitropism (plant growth towards gravity) and phototropism (plant growth towards light). The*

*second experiment investigates how micro-G affects the model organism Caenorhabditis elegans, a small nematode worm.]*

L-A also did the daily routine maintenance of the SOZh environmental control & life support systems in the SM, including ASU toilet facilities systems/replaceables and today also the periodic (~monthly) checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

Suni updated/edited the standard daily IMS (Inventory Management System) "delta" file, which tracks equipment items & stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

After unstowing the new Liquid Unit (BZh #610056) for the Elektron oxygen (O<sub>2</sub>) generator, delivered on Progress M-59/24P, Misha Tyurin connected it up to the Nitrogen Purge Unit (BPA #21) and pressure-tested it with 1 atm N<sub>2</sub> by operating the BPA tank's manual valve. *[During Elektron operation, the inert gas locked up in the BZh has the purpose to prevent dangerous O<sub>2</sub>/H<sub>2</sub> mixing.]*

Working off his Russian "job jar" discretionary task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also off the voluntary job list, Misha conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 & 800 mm focal length lenses to take pictures of natural environment targets. *[Today's Uragan photo targets were volcanoes on Kamchatka (nadir), the northern slopes of the Kazbek volcano and the Kolka glacier, the current forest fire situation in the Volga River delta, and a dust storm blowing from the Aral Sea.]*

An additional voluntary task for Tyurin was the usual status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copied L-A's, Misha's, and her own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*Neutron Telescope (VTN-M1) Update:* On 2/26, the Russian VTN-M1 high-energy neutron telescope (also known as HEND-2/High Energy Neutron Detector-2) was successfully activated on ISS and is since transmitting data to TsUP for IKI (Space Research Institute of the Russian Academy of Sciences) in Moscow. VTN-M1, the backup unit of HEND-1 currently working in Mars orbit aboard NASA's Mars Odyssey, was installed outside the SM last November by Tyurin and L-A on Orlan EVA-17 and hooked up during the recent EVA-17A.

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Karakoram** (*this is an extensively glaciated area with some of the world's longest mountain valley glaciers and elevations in the 20,000 to 29,000 ft range centered near 36.5N 75.65E. Although snow cover may reduce the contrast of the glacial features, the crew was to try for a near-nadir E-W mapping of the target area for contextual views*), **Tigris-Euphrates Delta** (*major upstream damming and continued rapid development in the valleys of these two Middle East rivers is causing dramatic changes in the geomorphology of their combined delta region centered near 30.0N 48.5E. The crew has already acquired some excellent imagery of this area. With this nadir pass they were to try a detailed mapping of the western margin of the delta from just north of Kuwait City to near the southern Iraqi city of Basra*), **Middlesboro Impact Crater** (*the town of Middlesboro is located in extreme southeastern Kentucky near the Tennessee border. The remains of a 300 million-year-old impact is just east of town near 36.62N 83.73W. Only the eastern rim of this 6-km in diameter feature is particularly noticeable. As ISS tracked northeastward on the main ridge of the Cumberland Mountains, the crew was to aim for this target area and the town on the NW side*), and **Hubbard Brook, New Hampshire** (*the Hubbard Brook Experimental Forest [HBEF] is a 3,160 hectare reserve located in the White Mountain National Forest of western New Hampshire, near 43.94N 71.75W. This Long Term Ecological Research [LTER] site is on the western side of the N-S corridor of Interstate 93 about 10 miles northwest of Lake Winnepesaukee. Using the long lens for detail. Snow and ice may still be present*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
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**ISS Orbit** *(as of this morning, 11:34am EST [= epoch]):*

Mean altitude -- 333.1 km

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Perigee height -- 319.4 km

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Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020509

Solar Beta Angle -- -55.1 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47474

**Significant Events Ahead** *(all dates Eastern and subject to change):*

04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)

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TBD -- STS-117/13A launch -- S3/S4 trusses -- (next window: April 22)

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TBD -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port) – depends on 13A

TBD -- SM reboost engine test (depends on 13A)

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch

06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking

07/09/07 -- STS-118/13A.1 undocking

07/12/07 -- STS-118/13A.1 landing

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/15/07 -- Progress M-60/25P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch

08/18/07 -- Progress M-61/26P docking (DC1)

08/26/07 -- STS-120/10A -- Node 2 launch

08/28/07 -- STS-120/10A -- Node 2 docking

09/04/07 -- STS-120/10A undocking  
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01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/06/07  
**Date:** Tuesday, March 06, 2007 1:33:05 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/06/07**

All ISS systems continue to function nominally, except those noted previously or below.

After yesterday's preparations by the FE-2, CDR Lopez-Alegria and FE-2 Williams today performed the scheduled outfitting on the new U.S. OGS (Oxygen Generator System) in the Lab. *[L-A and Sunita equipped the OGS doors and AAA (Avionics Air Assembly) manifold with foam sound mufflers, connected the Gamah fitting of the H<sub>2</sub> vent line to the inboard side of the port water bulkhead isolation valve (which vents the hydrogen generated by the OGS electrolysis process to the outside), set up the leak check equipment and then proceeded with the 90-min leak check of the H<sub>2</sub> line. Subsequent work focused on configuring the Lab UOP-3 (Utility Outlet Panel 3) with a PS-120 (Power Strip) junction box (i.e., adding four individual junctions) to power the OGS water delivery system, activating it and using it to pump water from a PWR (Payload Water Reservoir) into the OGS water delivery accumulator ORU (On-orbit Replacement Unit). This initial fill of the feedwater tank is in preparation for OGS activation after the planned CCS computer upgrade with vers. R5 software and also allows the PWR to be used again for refill on 13A. ]*

FE-1 Tyurin supported the reactivation of the Elektron-VM oxygen generator with the usual preceding nitrogen (N<sub>2</sub>) purge of the Liquid Unit (BZh). *[Elektron was deactivated earlier for the installation and rearranging of various electronics equipment in the Russian segment which required turning off BITS2-12 onboard measurement telemetry and VD-SU control mode. The new BZh delivered on Progress M-59/24P will be unstowed and N<sub>2</sub>-pressure tested tomorrow.]*

Sunita Williams performed a voltage check of the spare battery for the TDR

(Temperature Data Recorder) of MELFI (Minus-Eighty Laboratory Freezer for ISS). *[Depending on the results, MELFI specialists may schedule additional activities to help them correct a recording anomaly seen with the TDR.]*

Mikhail Tyurin had about 5 hrs. reserved today for more post-EVA-17A cleanup in the SM PkhO (Transfer Compartment) and DC1 (Docking Compartment), reconfiguring systems and gear to nominal status plus stowing EVA tools. Ground specialists stood by for tagup support if required.

Mike L-A performed the periodic CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout on the prime unit (#1051) and backup unit (#1044). *[L-A changed out the prime unit's battery, then zero-calibrated both instruments. Following zero calibration, the backup unit was stowed, while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

The FE-1 completed the daily routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Later, Tyurin updated/edited the standard daily IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Misha also performed the standard weekly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), to check the condition of the roller bearings and record its time & date values.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copied L-A's, Misha's, and her own exercise data file to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his Russian "job jar" discretionary task list, the FE-1 completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a

temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also off the voluntary job list, Misha conducted another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 mm & 800 mm focal length lenses to take pictures of natural environment targets. *[Main Uragan photo targets in March are the Volga River delta and Volga-Akhtubinsk alluvial plain (forest fires), a coastal strip of the western portion of the Aral Sea (effects of the dam built between Great Aral and Small Aral), the Mzymta River valley, the main Caucasus Ridge and adjacent slope towards Russia, Pamir glaciers, Aegean Sea islands (e.g., Lesbos), ground cover near large water reservoirs and lakes in Greece, and the Huascaran Glacier in Peru.]*

At ~11:00am EST, Suni set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 11:05am conducted a ham session with students at Boulder Hill Elementary School in Montgomery, Illinois. *[At the school, fourth and fifth graders are involved in the school's Ham Radio Club. This contact was integrated in the school/s curricula through science and art activities including the investigations of the Earth in space, communications, and the ISS. Local, government officials and the media have been invited to the event. "If I wanted to become an astronaut, what type of classes would I need to take in school?"; "How do you brush your teeth in space?"; "What is the scariest thing you have ever done in space?"; "Have you ever seen a storm on a different planet?"; "How do you take showers in space?"]*

At ~12:10pm, L-A and Suni conducted a teleconference with Expedition 15 crewmembers via S-band/audio.

*Saturday Science Update:* Sunita Williams was thanked for last Saturday's successful operation of the CFE (Capillary Flow Experiment) "Vane Gap 1" session. Options for the next voluntary "Saturday Science" program (3/10), at the crew's choice, will be (a) an ALTEA-CNSM (Anomalous Long-Term Effects on Astronauts-Central Nervous System Monitoring) run, if both crewmembers are participating (their choice as to being subject or operator), and (b) the "Internal Corner Flow" portion of CFE, if only one wishes to participate. *[The latter experiment studies capillary flow in micro-G in two vessels, one with triangular cross section, the other with rectangular cross section of their tapered flow lines.]*

*ZPM Update:* The Zero Propellant Maneuver on 3/3 from +XVV (+x-axis into velocity vector) by 180 deg to -XVV on pre-loaded time-tagged attitude & rate commands from the C&C MDMs (Command & Control Multiplexer/Demultiplexer computers) was successfully performed using CMGs (Control Moment Gyroscopes)

only, though at a snail's pace. Momentum topped out at 74.2% (of CMG capability, = "saturation"), saving approximately 20 kg of propellant. *[The ZPM, used first last year in a test (11/5/06), is a new technique developed by JSC Engineering/Drapeer personnel. With sufficient CMG momentum (and time!), attitude maneuvers can be performed without the use of thrusters, thus conserving precious props. In ZPM, a series of attitude & turning rate command pairs transition the ISS from an initial attitude/rate/momentum state to a desired final state under the constraints of bounded CMG momentum and gimbal rates. If there are issues with the execution of ZPM, a propulsive attitude control command will be issued to maintain attitude control. The station will remain in -XVV +ZLV TEA (+z-axis in local vertical/Torque Equilibrium Attitude) momentum management until 3/15, when it will be maneuvered back to +XVV with another ZPM.]*

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Afar Rift Zone, Ethiopia** (as ISS tracked northeastward up the Great Rift Valley region of east Africa, the crew was to shoot right of track as they approached the south end of the Red Sea. Geologists believe that this seismically active portion of the rift has the potential for cataclysmic change in the coming decades. In a contextual mapping pass documenting baseline conditions of the positions and orientation of water bodies and geologic structures for future change comparisons. Center Point is 13.0N 41.0E), and **Georgia Coastal Ecosystems** (ISS had an excellent pass over this Long Term Ecological Research [LTER] site. Shooting right of track and mapping in detail the coastal wetlands and barrier islands north of Jacksonville Florida to Charleston, South Carolina).

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07/20/07 -- Progress M-60/25P undocking & reentry  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/05/07  
**Date:** Monday, March 05, 2007 1:26:46 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/05/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 24 of Increment 14.*

Working in the RS (Russian segment), FE-1 Mikhail Tyurin performed several intricate servicing & “remodeling” tasks, starting with the collection of the periodic air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Next, the FE-1 took atmospheric samples in the SM (Service Module) using the CMS (Counter Measure System) Trace Contaminant Analyzer for real-time gas monitoring of potential harmful contaminants (HCHO, CO, NH<sub>3</sub>, Ozone (O<sub>3</sub>), plus Benzene) in special CMS chip cassettes.

In preparation for the upcoming (3/7) testing of downloading ASN-M Satellite Navigation System data to the Russian Laptop 3 (LT3), Tyurin set up the cable configuration and connections. *[Testing the LT3 software application for this had previously been part of Tyurin’s discretionary “time available” task list. The onboard ASN-M system, Russia’s equivalent of the U.S. GPS, will be required for the arrival of the European ATV (Automated Transfer Vehicle) “Jules Verne” later this year (not earlier than September).]*

FE-2 Sunita Williams prepared for this week’s OGS (Oxygen Generator System) outfitting activities by reviewing uplinked procedures and readying equipment from stowage locations. *[Tomorrow’s planned intravehicular activities include installation of a muffler and a hose to mitigate OGS noise, reconnect two sections of*

*the OGS waste water jumper disconnected by Williams in January for easier stowage, and installing the jumper between the OGS Rack UIP (Utility Interface Panel) and Z-Panel. For further noise reduction, the FE-2 will also outfit the OGS doors with foam insulation, set up and conduct a leak check of the H<sub>2</sub>/N<sub>2</sub> (hydrogen/nitrogen) vent valve hose, prepare UOP-3 (Utility Outlet Panel 3) to power the OGS feedwater system, and then use the feedwater pump to charge the feedwater tank with water from a PWR (Payload Water Reservoir).]*

CDR Michael Lopez-Alegria and Sunita Williams conducted the periodic food inventory & stowage audit in the ISS.

The CDR also had time reserved for working in the FGB to assess the available stowage volume behind panel 405.

Williams worked on the RED (Resistive Exercise Device), replacing canister pulley cables (done after every 53,515 cycles, based on life cycle testing results & safety controls), afterwards concluding with the standard Flexpac canister load calibration as required after cable replacements. (Last time done: 1/11/07). *[The on-orbit calibration of the Schwinn RED cans re-establishes the relationship of specific load settings with a specific number of pulls per setting, followed by recording of the load values measured with a calibration tool and steel handles from the on-orbit calibration kit.]*

In the U.S. Airlock (A/L), L-A and Sunita performed maintenance work on the EMU (Extravehicular Mobility Unit) systems. *[After first replacing EMU backpack #3018 in the forward EDDA (EMU Don Doff Assembly) with backpack #3006, they dumped the contents of the latter's feedwater tank and refilled it with fresh water from a PWR. The same procedure was also performed on backpack #3008, using another PWR (to reduce the chances of gas bubbles in the EMU tanks). EMU #3018 was stowed in the Node. The A/L CCAA (Common Cabin Air Assembly) air conditioner ran during the crewmember's stay in the A/L.]*

Working in the SM behind panel 131, Mikhail Tyurin rearranged Russian water treatment components, first unlocking the condensate collector tank (SBK1) and moving it to an open position on the right, then also transferring its associated local temperature sensor commutator (LKT TA251M) and its cabling. Activities were supported by ground specialist tagup. *[The relocation required deactivation of the BITS2-12 onboard measurement telemetry system and VD-SU control mode, which in turn required temporary powering down of Elektron (off/on by TsUP/Moscow), SKV2 (off/on by TsUP), Vozdukh (automatically off only if in automated mode), BMP (off/on automatically), and SRVK (off/on manually by crew or remotely by TsUP).]*

In addition, Misha also performed Part 1 of the scheduled installation of a new Russian BSPN payload server computer and its thermal control unit (UTS) in the SM. Today's work consisted of tool preparation and assembly of the mounting bracket of the BSPN from individual components. *[More work is scheduled tomorrow, including bolting the BSPN to its bracket and installing the latter with its housing an air duct in the newly rearranged space behind panel 131.]*

The CDR had time set aside for studying training material for the ALTEA/CNSM (Anomalous Long-Term Effects on Astronauts/Central Nervous System Monitoring) experiment, scheduled to be performed on Sunita on 3/8 (Thursday). *[L-A has not received ALTEA/CNSM operator training on the ground. Purpose of ALTEA is to define and measure descriptors for the electrophysiological brain functioning and to follow their dynamics, correlating it with space environments. This involves CNSM measuring sessions by Suni Williams wearing a helmet, plus long-term unmanned real-time particle flux dosimetry (DOSI mode) inside the ISS using six particle detectors (originally introduced on Mir). A specific focus of CNSM is on abnormal visual perceptions (such as the often reported phosphenes, - "light flashes") and the impact of particles on brain functions in micro-G. For this, ALTEA employs a 32-channel EEG (Electroencephalograph) system, a visual stimulator and a pushbutton. These devices can be used separately or in any combination, permitting several different experiments: in physics, dosimetry, psychophysics, electrophysiology and cognitive neurophysiology.]*

The FE-1 completed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Later, Tyurin updated/edited the standard daily IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

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Also from the “time permitting” job list, Tyurin completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A third suggestion for Misha was another session with the Russian “Uragan” (hurricane) earth-imaging program, using the Nikon D1X digital camera with 400 mm & 800 mm focal length lenses to take pictures of natural environment targets. *[Specific target areas today were Vladivostok and Sakhalin Island, the Altai Mountains, Tyva, the South Baikal Sea, the Caucasus mountain range, Volga delta with Adler and Krasnaya Polyana, lakes of the northern part of the Danube River near Izmail, the Swiss Alps, Allaline Glacier and Lake Geneva.]*

*SKV1 Update:* TsUP/Moscow continues “tweaking” the Russian SKV1 air conditioner, which has been showing some offnominal behavior after new component installation, trying out different loop settings and temperatures. Special troubleshooting is not considered necessary.

No CEO (Crew Earth Observation) photo targets uplinked for today.

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TBD -- STS-117/13A docking  
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TBD -- STS-117/13A landing @ KSC  
TBD -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port) – depends on 13A **(added)**  
TBD -- SM reboost engine test (depends on 13A) **(added)**  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking  
07/09/07 -- STS-118/13A.1 undocking  
07/12/07 -- STS-118/13A.1 landing  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A – Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
09/07/07? -- ATV (Automated Transfer Vehicle) launch (NET) **(added)**  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/04/07  
**Date:** Sunday, March 04, 2007 11:23:08 AM  
**Attachments:** [image002.gif](#)

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### **ISS On-Orbit Status 03/04/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for Expedition 14 (CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin, FE-2 Sunita Williams). Ahead: Week 24 of Increment 14.*

Wake-up last night: 9:00pm EST; sleep: 12:30pm today. *[With the launch of Mission 13A delayed till at least end of April, a major shift in crew work/sleep cycle will be implemented to support the Soyuz 14S launch on 4/7, moving the cycle to the right by about 13 hours over the next two weeks.]*

FE-1 Mikhail Tyurin completed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

Working off his Russian "job jar" discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

Also from the "time permitting" job list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A third suggestion for Misha's choice was another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the SONY PD-150P camcorder to record high production zones and associated oceanic phenomena in the Atlantic Ocean. *[Uplinked target zones were the coast*

*of Brazil, the Moroccan Upwelling, Gibraltar, Mediterranean Sea, Gulf of Mexico, the course of the Gulf Stream, the Grand Banks, and the English Channel (La Manche).]*

Remaining on Misha's discretion: taking photographs of panels 412, 415 plus cables behind panel 413 in the SM, for the ground to assess cable length requirements for the planned installation of control panel for the European ATV (Automated Transfer Vehicle) on SM panels 412 and 415.

Another voluntary task on the Russian job list was the periodic check of the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the MATRYOSHKA-R payload in the DC1 Docking Compartment. *[The reader automatically records radiation readings at strictly defined times (:00, :15, :30, :45 minutes). The complex Matryoshka payload suite is designed for sophisticated radiation studies. The payload collects radiation measurements every 15 minutes of each hour around the clock. Note: Matryoshka is the name for the traditional Russian set of nested dolls, also called Babushka dolls when they are little old ladies ("grandmas").]*

A task item for Sunita Williams on the U.S. "job jar" for today was SoRGE (Soldering in Reduced Gravity Experiment). *[For long-duration exploration missions, astronauts must eventually be able to repair delicate electronics in space. Previous experience from soldering studies in micro-G have identified greater porosity (or voiding) in solder joints made in space compared to those produced on Earth. This porosity, which affects the reliability of the solder joint, was found to come from two sources: vaporized flux (which is embedded in the solder), and water vapor trapped in the circuit board, driven out by the heat of the soldering process. In both cases, these vapor bubbles were trapped in the solidified solder joint, due to the lack of buoyancy which would drive out such bubbles in normal gravity. SoRGE is intended to confirm these results and test whether solid-core solder with an externally applied flux reduces the prevalence of voids in the solder. It is the next step in understanding the best techniques for repair of electronics components in space.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Mike L-A and Suni had their weekly PFCs (Private Family Conferences) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop), L-A at ~7:00am EST, Suni at ~8:40am.

*Soyuz 14S Update:* Russian launch schedule remains unaffected by the Atlantis/ STS-117 delay. Expedition 15 crewmembers CDR Fyodor Yurchikhin (RSC-E) and FE-1 Oleg Kotov, with Space Flight Participant Charles Simonyi (VC-12) met with RSC-Energia President N.BN. Sevastianov last week (3/1). Depicted (below) is their inspection of Yuri Gagarin's Vostok-1 capsule in the RSC-E museum.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 4:11am EST [= epoch]*):

Mean altitude -- 333.4 km

Apogee height -- 347.2 km

Perigee height -- 319.7 km

Period -- 91.20 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020438

Solar Beta Angle -- -47.8 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 57 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47421

**Significant Events Ahead** (*all dates Eastern and subject to change*):

04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (SM aft port, 3pm)

04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) & landing (6-9am)

TBD -- STS-117/13A launch -- S3/S4 trusses (6:43am) -- NET

TBD -- STS-117/13A docking (2:10am)

TBD -- STS-117/13A undocking (10:05 pm)

TBD -- STS-117/13A landing @ KSC (2:05am)

05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

05/05/07 -- SM reboost engine test

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking  
07/09/07 -- STS-118/13A.1 undocking  
07/12/07 -- STS-118/13A.1 landing  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch.

*Soyuz TMA-10/14S crew viewing Vostok-1 capsule of Yuri Gagarin (1961)*



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/03/07  
**Date:** Saturday, March 03, 2007 2:57:41 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/03/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams, except for regular maintenance and voluntary work.*

ISS crew work/rest cycle: wake-up last night 9:00pm EST; sleep 12:30pm today. *[Next wake-up: 9:00pm tonight; sleep: 12:30pm tomorrow.]* With the launch delay of Mission 13A, a major shift in crew work/sleep cycle will be implemented to support the Soyuz 14S launch on 4/7, moving the cycle to the right by about 13 hours over the next two weeks.

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, FE-1 Tyurin performed preventive maintenance cleaning on the SM ventilation system, today replacing filters on ventilation fans in position VPO10, VAP2, and VOP3.

In the U.S. Airlock, FE-2 Williams terminated the regeneration of the last METOX (Metal Oxide) CO<sub>2</sub> filtration canister in the oven.

Afterwards, Williams disconnected the bypass jumper from the LAB1D6 rack to the

ITCS LTL (Internal Thermal Control System/Low Temperature Loop), now no longer required for cooling after the U.S. CDRA (Carbon Dioxide Removal Assembly) was deactivated by ground commanding earlier this morning (~4:20am).

FE-1 Tyurin completed the IFM (in-flight maintenance) on the SKV air conditioners in the SM by outfitting the second unit (SKV2) with new noise suppression hardware, supported by ground specialist tagup. The same outfitting was done yesterday on the SKV1.

For today's voluntary "Saturday Science" program, Sunita set up the CFE (Capillary Flow Experiment) equipment in the Lab MWA (Maintenance Work Area) and performed the experiment. Afterwards, she tore down and stowed the hardware. *[CFE makes use of the station's micro-G environment to investigate the special dynamics of capillary flow, i.e., the interaction of liquid with solid that can draw a fluid up a narrow tube and can be exploited to control fluid orientation so that fluid systems on spacecraft perform predictably. Sunita performed the "Vane Gap 1" portion of the CFE suite, a study of capillary flow when there is a gap between interior corners of fluid containers, such as in the gap formed by an interior vane and tank wall of a large propellant storage tank, or the near intersection of vanes in a tank with a complex vane network. The results of CFE will have applications to management of liquid fuels, cryogenics, water-based solutions, and thermal fluids in spacecraft systems. The last CFE session was conducted by FE-1/SO Jeff Williams on Expedition 13. Today's was the sixth run aboard ISS.]*

CDR Lopez-Alegria completed the routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

The FE-2 downlinked the CO<sub>2</sub> data collected with the CDM (Carbon Dioxide Monitor) during yesterday's comprehensive survey.

Working off his Russian "time permitting" discretionary task list, the FE-1 performed the periodic water tank recharge, as required, on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

Also from the voluntary task list, Misha Tyurin conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A third discretionary job on the “free time” listing for Mikhail was another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with the 400 mm focal length lens to take pictures of natural environment targets. [*Specific target areas today were Vladivostok and Sakhalin Island, the Altai Mountains, Tyva, the South Baikal Sea, the Caucasus mountain range, Volga delta, and the Huascarán Glacier in Peru.*]

Also at Misha’s discretion for today: taking photographs of panels 412, 415 plus cables behind panel 413 in the SM, for the ground to assess cable length requirements for the planned installation of control panel for the European ATV (Automated Transfer Vehicle) on SM panels 412 and 415.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Mike L-A copied Suni’s, Misha’s, and his own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~6:30am, Misha had his weekly PFC (Private Family Conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

At 11:30am EST, MCC-H began the ZPM (Zero Propellant Maneuver), slewing the ISS through 180 deg from +XVV (+x-axis in velocity vector) attitude to -XVV (i.e., flying aft end forward) using non-propulsive CMG (Control Moment Gyroscope) maneuvering only. The maneuver was to last ~2 h 45 min.

### **Weekly Science Update** (*Expedition Fourteen -- 23<sup>rd</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Crew replaced the PCMCIA card on 2/28 and reported on data file size, which indicates nominal status of the facility.

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* ALTEA software enhancement for the DOSI mode was successfully implemented on 3/2.

*BASE:* Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA):* Complete.

*CBOSS (Cellular Biotechnology Support Systems):* Complete.

*CFE (Capillary Flow Experiment):* Complete.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* Two student experiments. In progress.

*CULT (Cultural Factors Questionnaire):* Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test):* Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* With the completion of the EarthKAM hardware stowage on 2/28, the second session of EarthKAM was concluded for this Increment.

*EPO (Educational Payload Operation):* Complete.

*ETD (Eye Tracking Device):* Complete.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology):* Planned

*GRAVI (Threshold Acceleration for Gravisensing):* Complete.

*IMMUNO (Saliva Sampling):* Complete.

*LEUKIN:* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs".

*NOA (Nitric Oxide Analyzer):* Complete.

*Nutrition:* Planned.

*PFE-OUM (Periodic Fitness Evaluation - Oxygen Uptake Measurement):*  
Completed on 3/1.

*PK-3 (Plasma Crystal 3):* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* An OCA message was sent to the crew to try a method to improve stability of the hardware (computer-to-table interface). Two sketches were sent and Sunita selected one. The selected method was successfully verified during the TRAC sessions on 3/2, but should not be used for the TRAC sessions during week 24.

*POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G):* Complete.

*RC (Refrigerated Centrifuge):* Planned.

*RS (Renal Stone):* Planned.

*SAMPLE:* Complete.

*SEM (Space Experiment Module):* Complete.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* In progress.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Planned.

*TRAC (Test of Reaction & Adaptation Capabilities):* Three sessions were held successfully on 3/2.

*TROPI (Study of Novel Sensory Mechanism in Root Phototropism):* Complete.

*YING (Yeast in No Gravity):* Complete.

*CEO (Crew Earth Observations):* Through 2/26 the ground has received a total of 4,828 of ISS/CEO images for review and cataloging. Researchers “are pleased to report your success in acquiring the Lonar Impact Crater target in India with the 400mm lens setting. We will ask for an 800mm view in the future. One of your excellent Somali coast views will be posted in NASA/GSFC’s Earth Observatory website this weekend. With a comparative image from 2005 it nicely documents the start of flooding behind the coastal dunes in response to anomalously high rainfall over interior Ethiopia.”

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Hyderabad, India** (*this Indian mega-city is located in the southern Deccan Plateau at 17.23N 78.29E. Despite its size, it remains a difficult target to photograph because of persistently turbid atmospheric conditions and poor contrast of the urban margins. As ISS approached from the SW, the crew was to look first for the following visual cues: the city is about 70-80 miles north of a pronounced N-S ridge of the Eastern Ghats range. Also, they were to roughly follow the bright sandbars of the Krishna River as it arcs northwestward from the coast towards the Hyderabad area*), **Urumqi, China** (*this remote city is located in a broad gap of the eastern Tien Shan Mountains of northwestern China near 43.48N 87.35E. ISS had a nadir pass as it approached from the SW. After crossing the vast dunes of the Takla Makan Desert the crew encountered the Tien Shan, looking for the city in a gap on the northern flank of the mountains*), and **Tenoumer Impact Crater** (*This small [1.9-km in dia.] meteorite impact is located in northern Mauritania, just left of track, at 22.9 N, 10.4 W. It is a very recent impact, less than 25,000 years old and has a distinct circular rim. As ISS tracked northeastward, the crew was to use the large, landmark Richat Structure as key.*)

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 3:55am EST [= epoch]*):

Mean altitude -- 333.5 km

Apogee height -- 347.2 km

Perigee height -- 319.8 km

Period -- 91.20 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020471

Solar Beta Angle -- -44.3 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47406

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (SM aft port, 3pm)

04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) & landing (6-9am)  
TBD -- STS-117/13A launch -- S3/S4 trusses (6:43am) -- NET  
TBD -- STS-117/13A docking (2:10am)  
TBD -- STS-117/13A undocking (10:05 pm)  
TBD -- STS-117/13A landing @ KSC (2:05am)  
05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
05/05/07 -- SM reboost engine test  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking  
07/09/07 -- STS-118/13A.1 undocking  
07/12/07 -- STS-118/13A.1 landing  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/02/07  
**Date:** Friday, March 02, 2007 2:33:26 PM  
**Attachments:** [image001.gif](#)

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### **ISS On-Orbit Status 03/02/07**

All ISS systems continue to function nominally, except those noted previously or below.

ISS crew work/rest cycle: wake-up last night 9:00pm EST; sleep 12:30pm today. *[Next wake-up: 9:00pm tonight; sleep: 12:30pm tomorrow.]* With the launch delay of Mission 13A, a major shift in crew work/sleep cycle will be implemented to support the Soyuz 14S launch on 4/7, moving the cycle to the right by about 13 hours over the next two weeks.

FE-1 Tyurin's daily morning inspection today included the routine checkup of Docking Compartment (DC1) circuit breakers and fuses. *[The monthly checkup in the "Pirs" DC1 looks at AZS circuit breakers on the BVP Amp Switch Panel (they should all be On) and the LEDs (light-emitting diodes) of 14 fuses in Fuse Panels BPP-30 & BPP-36.]*

Tyurin completed the IFM (inflight maintenance) on the SKV1 air conditioner in the Service Module (SM) by outfitting it with new noise suppression hardware, supported by ground specialist tagup. The same outfitting will be performed tomorrow on the second air conditioner (SKV2).

Afterwards, the FE-1 set up the SLM (Sound Level Meter) instrumentation and took acoustic measurements to check out the efficacy of his latest noise dampening efforts, with ground specialists standing by for tagup if required. The readings were then transferred to the MEC (Medical Equipment Computer) for subsequent downlink, and SLM ops were closed out. *[Noise levels were measured near the SKV, near the SM Central Post, and near the Vozdukh CO2 scrubber system, with SKV2 and the Elektron turned off and SKV1 turned on.]*

FE-2 Williams conducted the periodic verification of IMV (intermodular ventilation)

airflow between the U.S. (USOS) and Russian segment (RS) by taking air flow measurements using the Velocicalc meter. In addition, she also took CO<sub>2</sub> readings with the CDM (CO<sub>2</sub> Monitor) in the SM and Lab. *[There is no direct measurement of airflow except as reflected by differences in atmosphere partial pressures measured between the RS and USOS. ppCO<sub>2</sub> (CO<sub>2</sub> partial pressure) is a good yardstick since an increasing ppCO<sub>2</sub> in the Lab not reflected in the SM indicates that Vozdukh is not receiving the air from the Lab at an efficient rate. Periodic air flow degradation checks support establishing a most effective fan cleaning schedule.]*

Later in the day, Sunita also used the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) for the regular atmospheric check for ppO<sub>2</sub> (Partial Pressure Oxygen). Batteries were to be replaced if necessary. *[O<sub>2</sub> measurements were gathered in the Lab with CSA-O<sub>2</sub> units #1041 & #1048.]*

CDR Lopez-Alegria worked on the ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, restarting the experiment's DAU (Data Acquisition Unit) with the usual CPU (Central Processing Unit) lockup procedure and checking out the resulting ALTEA display on the ELC. *[This activity was conducted in two parts, separated by 15 min to allow the ALTEA software to load. Purpose of ALTEA is to define and measure descriptors for the electrophysiological brain functioning and to follow their dynamics, correlating it with space environments. ALTEA uses six particle detectors (originally introduced on Mir), a 32-channel EEG (Electroencephalograph) system, a visual stimulator and a pushbutton. These devices can be used separately or in any combination, permitting several different experiments: in physics, dosimetry, psychophysics, electrophysiology and cognitive neurophysiology.]*

Later, the CDR also did the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected.

Lopez-Alegria took the general U.S. PFE (Periodic Fitness Evaluation) test, a monthly 1.5-hr. procedure to check up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (Cycle Ergometer with Vibration Isolation) in the Lab. Williams assisted the CDR as CMO (Crew Medical Officer). Readings were taken with the BP/ECG (Blood Pressure/Electrocardiograph) and the HRM (Heart Rate Monitor) watch with its radio transmitter. *[BP/ECG provides automated noninvasive systolic and diastolic blood pressure measurements while*

*also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise.]*

Mikhail Tyurin underwent the periodic (generally monthly) health test with the cardiological experiment PZEh MO-1 "Study of the Bioelectric Activity of the Heart at Rest" on the TVIS (Treadmill with Vibration Isolation System), assisted by Lopez-Alegria. *[During the 30-min. test, the crew tagged up with ground specialists on Russian ground site (RGS) passes on Daily Orbit 16 (~2:13am EST) via VHF and downlinked data from the Gamma-1M ECG (electrocardiograph) for about 5-6 minutes.]*

The crewmembers completed their third time with the NASA-sponsored German/Canadian experiment TRAC (Test of Reaction & Adaptation Capabilities). Sunita Williams set up the video gear and assembled the TRAC hardware in the work area (i.e., laptop, joystick, headphones, and time box). Afterwards, the three crewmembers performed their data take sessions. Afterwards, the FE-2 closed out and stowed the equipment. *[TRAC tests the idea that the decrease in motor skills reported by some astronauts (for example, hand-eye coordination), is due to the brain adapting to being in space. By testing hand/eye coordination of crewmembers, scientists hope to test the theory that while the brain is adapting its sensory-motor functions to space it is unable to fully provide the resources necessary to perform normal manual skills, i.e., the data will be used to show that adaptation to zero-G draws on resources normally used for computational tasks, for example. Crewmembers test their hand-eye coordination prior to the mission, while on orbit and then again when they have returned to Earth. TRAC hardware includes a laptop mounted to a table and a joystick to control the cursor on the PC screen. Also used are audio headphones and a reaction time box to respond to audio and visual stimuli. For the test the crewmember is sitting on the floor of the Lab module, with legs restrained and the work table on the legs.]*

In the U.S. Airlock, the FE-2 terminated the regeneration of the second METOX (Metal Oxide) CO<sub>2</sub> filtration canister in the oven and initiated the process on the third one. In support, CDRA (CO<sub>2</sub> Removal Assembly) continues to run. Total time required for the bake-out: 14 hrs.

Mike L-A and Sunita completed another filling out of the regular weekly FFQ (Food Frequency Questionnaire) on the MEC, his 21<sup>st</sup> and Sunita's 10<sup>th</sup>, which keeps a personalized log of their nutritional intake over time on special MEC software. *[The FFQ, updated with the new food brought up on 12A.1, records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. IBMP/Moscow (Institute of Biomedical*

*Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value of the crew’s food intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]*

The CDR and FE-1 had another two hours allotted for continuing post EVA-17A cleanup in the SM PkhO (Transfer Compartment) and DC1 (Docking Compartment), reconfiguring systems and gear plus stowing EVA tools. Ground specialists stood by for tagup support if required.

In support of the planned structural dynamics evaluation of Tyurin’s subsequent workout on the Russian VELO cycle ergometer, the FE-2 installed an IWIS RSU (Internal Wireless Instrumentation System/Remote Sensor Unit) and its cabling in the FGB, using the cable located on 2/22.

Also for the VELO workout, Williams set up the Sony PD100 camcorder and later took CO<sub>2</sub> levels with the CDM (Carbon Dioxide Monitor) equipment, including during her CEVIS (Cycle Ergometer with Vibration Isolation) exercise session. The video tape was later played back for time code marking/synchronization and the camcorder deactivated. Tomorrow, Suni will downlink the collected data to the MEC. *[Purpose of this series of activities is to gather information on the spatial and temporal variations in CO<sub>2</sub> concentrations under specific conditions that can occur within the ISS, in support of Station Development Test Objective (SDTO) 25007, “Spatial Differences in CO<sub>2</sub> Concentrations on ISS”.]*

With all the monitoring equipment in place, the crew worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (FE-1), RED (CDR, FE-1, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Mike L-A copied Suni’s, Misha’s, and his own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The FE-2 completed the daily updating/editing of the standard IMS (Inventory Management System) “delta” file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

L-A undertook the routine maintenance of the SM’s SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/

replaceables.

At ~4:05am EST, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~9:30am EST, Tyurin linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Discussions today concerned the current locations of a BK BKV water purification column removed on 2/26 and a BNP #3 air pressurization bottle, cargo transfers before and after EVA-17A, and an uplinked list of hardware still located in Progress M-58/23P (being used as stowage volume).]*

At ~10:35am, the crewmembers conducted their regular weekly tagup with the Lead Flight Director at JSC/MCC-H.

At ~11:15am, Suni set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 11:20am conducted a ham session with students at Virginia Run Elementary School in Centreville, VA. *[Virginia Run Elementary School, located approximately 20 miles west of Washington, D.C., in Fairfax County, provides education to 830 children between the ages of 5 and 12 years, from Kindergarten through 6<sup>th</sup> grade. The entire school has been busy preparing for the ARISS contact with the space station, holding a contest among students to select the 15 best questions from all levels. Former ISS Astronaut and also community member Carl Walz participated in pre-contact activities. "Is it pitch black in space besides the stars?"; "How does the air get in the space station?"; "If you could talk with any former astronaut, who would it be and what would you talk about?"; "What has been your biggest surprise since you've been up in space?"]*

At ~12:15pm, CDR Lopez-Alegria held a discretionary private conference via Ku-band/video & S-band/audio.

Working from the Russian voluntary/"time permitting" task list, Tyurin conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also at Misha's discretion for today: another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with the 400 mm focal length lens to take pictures of natural environment targets.

*[Specific target areas today were the Caucasus mountain range, the Caspian and Aral Seas, Kolka Glacier, industrial & natural coastal environments of Greece, and the Carpathian Mountains.]*

A third item on Tyurin's task list was the periodic status check and water tank recharge, as required, on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

For tomorrow's voluntary "Saturday Science" program, Sunita Williams and Mike L-A have been given two options: ALTEA-CNSM (Central Nervous System Monitoring) if both of them decide to do the program, or CFE (Capillary Flow Experiment) if only one of them chooses to participate.

At ~9:00am EST this morning, the portside outboard waste water vent valve was opened by ground commanding, to remain open for ~60-72 hours for the purpose of drying out of the port water vent lines in preparation for OGS (Oxygen Generation System) work by the crew next week. No action by the crew was required at this time.

*Joint Science Research:* Outside the ISS, the FPMU (Floating Potential Measurement Unit) continues to run, activated yesterday by ground commanding. This is a joint exercise with an MIT ground experiment, viz., World Day data acquisitions for the Millstone Hill Incoherent Scatter Radar. *[The incoherent scatter radar facility at Millstone Hill, part of the MIT Haystack Observatory, has been supported by the NSF (National Science Foundation) since 1974 for studies of the earth's upper atmosphere and ionosphere. Comparison of ground radar data and ISS FPMU data is critical for FPMU verification and calibration, an important backup to the PCUs (Plasma Contactor Units) to gage EVA hazard.]*

*Academician B. Ye. Chertok:* At Dr. Boris Chertok's 95<sup>th</sup> birthday reception yesterday at RSC-Energia a NASA delegation joined the line of distinguished guests greeting the respected and beloved pioneer of Russian cosmonautics with sincere congratulations from NASA (see picture below, with Dennis McSweeney/NMLO, on right, and Philip Cleary/MTLO. Other pics: [http://www.energia.ru/english/energia/news/news-2007/photo\\_03-01.html](http://www.energia.ru/english/energia/news/news-2007/photo_03-01.html)).



Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Afar Rift Zone, Ethiopia** (as ISS tracked northeastward up the Great Rift Valley region of east Africa, the crew was to look right of track as they approached the south end of the Red Sea. Geologists believe that this seismically active portion of the rift has the potential for cataclysmic change in the coming decades. In a contextual mapping pass document baseline conditions of the positions and orientation of water bodies and geologic structures for future change comparisons. Center Point is 13.0N 41.0E), and **Arkenu 1 and Arkenu 2 Impact Craters** (ISS had a nadir pass over this double impact site in southeastern Libya near 22.06N 23.75E. Using the long lens settings for details of this 6.8km in diameter feature).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 11:42am EST [= epoch]):

Mean altitude -- 333.6 km

Apogee height -- 347.2 km

Perigee height -- 319.9 km

Period -- 91.20 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020324

Solar Beta Angle -- -40.5 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in last 24 hours -- 152m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47395

**Significant Events Ahead** *(all dates Eastern and subject to change [changes are called out]):*

03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM), i.e., on CMGs;

04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (SM aft port, 3pm)

04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) & landing (6-9am)

TBD -- STS-117/13A launch -- S3/S4 trusses (6:43am) -- NET

TBD -- STS-117/13A docking (2:10am)

TBD -- STS-117/13A undocking (10:05 pm)

TBD -- STS-117/13A landing @ KSC (2:05am)

05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

05/05/07 -- SM reboost engine test

08/15/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch

06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking

07/09/07 -- STS-118/13A.1 undocking

07/12/07 -- STS-118/13A.1 landing

07/13/07 -- FGB solar array retraction

07/20/07 -- Progress M-60/25P undocking & reentry

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/15/07 -- Progress M-60/25P undocking (DC1) & reentry

08/16/07 -- Progress M-61/26P launch

08/18/07 -- Progress M-61/26P docking (DC1)

08/26/07 -- STS-120/10A -- Node 2 launch

08/28/07 -- STS-120/10A -- Node 2 docking

09/04/07 -- STS-120/10A undocking

09/07/07 -- STS-120/10A landing

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing

Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 03/01/07  
**Date:** Thursday, March 01, 2007 2:36:21 PM  
**Attachments:**

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### **ISS On-Orbit Status 03/01/07**

All ISS systems continue to function nominally, except those noted previously or below.

ISS crew work/rest cycle: wake-up last night 9:00pm EST; sleep 12:30pm today.  
*[Next wake-up: 9:00pm tonight; sleep: 12:30pm tomorrow.]*

With the launch of STS-117/13A slipping from 3/15 to "not earlier than end of April", a major shift in crew work/sleep cycle will be implemented, moving the cycle to the right by about 13 hours over the next two weeks. This is in support of the Soyuz 14S launch (4/7) and docking (4/9, ~3pm EST).

Before breakfast and exercise, CDR Lopez-Alegria, FE-1 Tyurin and FE-2 Williams completed their third session with the periodic Russian MedOps test "Hematokrit" (MO-10), measuring red cell count of the blood. *[The blood samples were drawn from a finger with a perforator lancet, then centrifuged in two microcapillary tubes in the M-1100 kit's minicentrifuge, and its hematocrit value was read off the tubes with a magnifying glass. It is a well-known phenomenon of space flight that red blood cell count (normal range: 30-45%) tends to go down over time. After the exam, the data were saved in the IFEP software (In-Flight Examination Program) on the MEC (Medical Equipment Computer), and Misha Tyurin stowed the equipment.]*

On the HRF-2 (Human Research Facility 2) rack, Sunita Williams broke out and set up the OUM-PFE (Oxygen Uptake Measurement - Periodic Fitness Evaluation) equipment to obtain measurements on herself according to protocol, with Mike Lopez-Alegria acting as OUM-PFE operator. The operations were documented with photo and video. Afterwards, Suni updated the evaluation protocol, deactivated & stored the gear, including photo/video equipment, and powered down the OUM-PFE laptop.

Williams spent most of the day monitoring her CO<sub>2</sub> (carbon dioxide) levels by wearing a personal CDM (CO<sub>2</sub> Monitor), except during the OUM-PFE, for which she doffed and deactivated the device. More CO<sub>2</sub> monitoring by the FE-2 is scheduled for her CEVIS (Cycle Ergometer with Vibration Isolation) session tomorrow, followed by data downlinking on Saturday (3/3).

As next-to-last step in the ongoing major IFM (inflight maintenance) on the two RS (Russian segment) air conditioners (SKV1,2) in the Service Module (SM), FE-1 Tyurin today performed the R&R (removal & replacement) of the SKV1's heat exchanger unit (BTA). Tomorrow, SKV1 will be taken through a checkout test, and both air conditioners will also be outfitted with new noise suppression hardware. *[The BTA replacement with a spare unit required deactivation (and later reactivation, at ~3:45am EST) of the BITS2-12 onboard telemetry measurement system and VD-SU control mode. With these turned off, other equipment also needed to be powered down, including Elektron (off/on by TsUP/Moscow), SKV2 (off/on by TsUP), Vozdukh (automatically off only if in automated mode), BMP (off/on automatically), and SRVK (off/on manually by crew or remotely by TsUP).]*

The CDR and FE-1 had another hour reserved for continuing post EVA-17A cleanup in the SM PkhO (Transfer Compartment) and DC1 (Docking Compartment), reconfiguring systems and gear plus stowing EVA tools. Ground specialists stood by for tagup support, if required.

Mike L-A also spent some more time on putting U.S. tools used for the spacewalk back into stowage.

In the U.S. Airlock, the FE-2 terminated the regeneration of the first set of METOX (Metal Oxide) CO<sub>2</sub> filtration canisters in the oven and initiated the process on the second set. In support, CDRA (CO<sub>2</sub> Removal Assembly) continues to run. Total time required for the bake-out: 14 hrs.

Both the CDR and the FE-2 completed the mandatory 30-min. CBT (computer-based training with video and audio) to refresh their CMO (Crew Medical Officer) proficiency/rating. *[To maintain proficiency in using HMS (health maintenance systems) hardware including ACLS (advanced cardiac life support) in contingency situations where crew life is at risk, these training sessions are performed once a month to review equipment and procedures via CBT. Besides ACLS, procedures include airway obstruction management, i.e., review of suction device, nasal airway, intubating laryngeal mask airway (ILMA) with endotracheal tube, and cricothyrotomy (incision to re-enable breathing air inflow).]*

At the Lab science window, Sunita disassembled the EarthKAM (Earth Knowledge Acquired by Middle School Students) experiment hardware and then stowed the equipment.

Using a camera with flash, the FE-2 also conducted the periodic close inspection of the Lab window panes. *[To avoid having too much light reflected back into the cabin (and camera), she was advised to hold the flash at an angle of ~30 deg to the camera.]*

Williams set up the video equipment for recording her subsequent physical exercise session on the RED (Resistive Exercise Device). After the session, the video gear was torn down and put back in stowage.

Mikhail Tyurin spent 1.5 hrs with the standard Russian PFE test MO-3, his fourth, using the TVIS treadmill for workout (in unmotorized mode) and wearing the Cardiocassette KK-2000 belt with three chest electrodes. (Last time done: 12/4/06) *[The fitness test, controlled from the RSE-Med laptop, yields ECG (electrocardiogram) readings to the KARDIOKASSETA-2000 (KK-2000) data storage device, later to be downlinked via U.S. OCA. Before the run, the KK-2000 was synchronized with the computer date/time readings. For the ECG, the FE-1 worked out on the TVIS, first walking 3 min. up to 3.5 km/h, then running at a medium pace of 6.5 km/h, followed by the maximum pace not exceeding 10 km/h, then walking again at gradually decreasing pace.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1/MO-3), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1). *[The ISS structural response to Misha's VELO workout will be measured tomorrow, with IWIS and a camcorder.]*

Afterwards, Suni copied L-A's, Misha's, and her own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The FE-2 completed the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Later, Sunita undertook the routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities

systems/replaceables.

Working from the Russian voluntary/"time permitting" task list, Tyurin conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also at Misha's discretion for today: another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with the 400 mm focal length lens to take pictures of natural environment targets. *[Specific target areas today were Vladivostok, the Sakhalin Island, the Caucasus mountain range and the Volga River.]*

Overnight (~9:25pm EST), on DO12-14, TsUP/Moscow undertook another propellant transfer from Progress M-59/24P's BG1,2 propellant tankage to the SM's ODU (Integrated Propulsion System) BG2 tank. *[BG1 was used on 2/16.]*

*Mission ISS-13A Planning Update:* A new launch date for STS-117/Atlantis has not been determined yet pending detailed damage assessment and resolution, but teams will focus on preparing for liftoff in late April, right after 13S return. Atlantis will be rolled back to the VAB this weekend. The S3/S4 truss will be removed from its cargo bay and remains out on the pad, safely ensconced in its PCR (Payload Control Room), with battery recharge capability. Ground teams are currently shuffling work schedules to offload an otherwise very high timeline pressure on Increment 15 resulting from the slip, and to move suitable work back to Increment 14. Tomorrow's planned reboost (orbital adjustment) by Progress 23P, intended to facilitate 13A rendezvous, has been cancelled. This change is being factored into the ZPM (Zero Pop Maneuver) planning for the 180-deg attitude change on Sunday (3/3). A new reboost, to adjust ISS orbit for 13S landing in its Northern Landing region in Kazakhstan on 4/19, is being developed, with typical dates being 3/15 or 3/28.

*TRRJ Loss of Communications:* The RJMC (Rotary Joint Motor Controller) of the starboard TRRJ (Thermal Radiator Rotary Joint) swapped strings last night due to as-yet unexplained LOC (Loss of Comm) between the two. The switchover from string 2 to string 1, by the FDIR (Fault Detection, Isolation and Recovery) algorithm, was nominal. TRRJ is now in directed position mode while the teams are assessing.

*Joint Science Research:* This morning (~7:00am), the FPMU (Floating Potential Measurement Unit) was activated by ground commanding. This was timed to coincide with an MIT ground experiment, viz., World Day data acquisitions for the

Millstone Hill Incoherent Scatter Radar. *[The incoherent scatter radar facility at Millstone Hill, part of the MIT Haystack Observatory, has been supported by the NSF (National Science Foundation) since 1974 for studies of the earth's upper atmosphere and ionosphere. Comparison of ground radar data and ISS FPMU data is critical for FPMU verification and calibration, an important backup to the PCUs (Plasma Contactor Units) to gage EVA hazard.]*

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Manila, Philippines** *(the city of Manila is the capital of the Philippines and is located on the eastern shore of Manila Bay on the island of Luzon. The metropolitan area has a population of 10 million people. Detailed imagery of the metropolitan area is requested. Center point is 14.35N, 120.95E),* **Bosumtwi Impact Crater** *(Bosumtwi impact crater is a fairly young impact crater, dated at 1.07 million years. Similar to Lonar crater in India, this impact crater is also filled by a lake. Crater diameter is 10.5 km. Lake Volta is the large reservoir that the crew probably noticed first. Bosumtwi is located in Ghana, almost directly west of Lake Volta. The crater should have been close to nadir. Center point is 6.5N, 1.25W),* **Tenoumer Impact Crater** *(Tenoumer impact crater is a relatively young crater and has a diameter of 1.9 km. The crew was alerted to the larger "bull's eye" or the Richat structure. Although the Richat structure has the appearance of an impact crater it is not. Center point for Tenoumer is 22.92N, 10.4W),* **Caracas, Venezuela** *(Caracas is the capital city of Venezuela and is located along the Venezuelan coastal range. The metropolitan area has an estimated population of 3.3 million [2005]. Mapping detail of the city and its boundaries is highly desirable. Center point is 10.47N, 67.03W),* and **Gulf of Fonseca** *(the Gulf of Fonseca [off the coast of El Salvador and Honduras] is rich in biodiversity containing vast mangroves, estuaries and natural lagoons. Several lagoons in the rainy season provide refuge for both migratory and non-migratory birds, as well as spawning grounds for various species of tortoise, mollusks, crustaceans, and fish. This delicate ecosystem is under increasing threats from the exploitation of the lands for shrimp farming and other industrial activities. Context views of the bay were requested. Center point is 13.0N, 87.5W).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 11:06am EST [= epoch]):*

Mean altitude -- 333.7 km

Apogee height -- 347.4 km  
Perigee height -- 320.1 km  
Period -- 91.21 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0020278  
Solar Beta Angle -- -36.4 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.79  
Mean altitude loss in last 24 hours -- 124 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47379

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM), i.e., on CMGs;  
04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (SM aft port, 3pm)  
04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) & landing (6-9am)  
TBD -- STS-117/13A launch -- S3/S4 trusses (6:43am) -- NET  
TBD -- STS-117/13A docking (2:10am)  
TBD -- STS-117/13A undocking (10:05 pm)  
TBD -- STS-117/13A landing @ KSC (2:05am)  
05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
05/05/07 -- SM reboost engine test  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking  
07/09/07 -- STS-118/13A.1 undocking  
07/12/07 -- STS-118/13A.1 landing  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking

09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/28/07  
**Date:** Wednesday, February 28, 2007 2:46:27 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

### **ISS On-Orbit Status 02/28/07**

All ISS systems continue to function nominally, except those noted previously or below.

ISS crew work/rest cycle: wake-up last night 9:00pm EST; sleep 12:30pm today.  
*[Next wake-up: 9:00pm tonight; sleep: 12:30pm tomorrow.]*

As next step in the ongoing major IFM (inflight maintenance) on the two RS (Russian segment) air conditioners (SKV1,2) in the Service Module (SM), FE-1 Tyurin today emptied the SKV1 unit of its Freon coolant (Russian: Khladon-218) by pumping it overboard. *[This activity, supported by tagup with TsUP/Moscow, involved careful preparations, installation of a special venting device (UD) with a manually driven pump and other pneumatic/hydraulic components. Also, prior to the venting CDR Lopez-Alegria closed the protective Lab window shutter, later opening it again about two orbits after the vent. Next step in the IFM will be R&R (removal & replacement) of the SKV1 heat exchanger unit (BTA), scheduled for tomorrow. On 3/2 (Friday), both air conditioners will also be outfitted with new noise suppression hardware].*

Before the Khladon venting, Lopez-Alegria collected the periodic cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN)].*

FE-2 Williams began her workday by terminating the regular processing of U.S. Lab-collected condensate water for the Elektron oxygen generator. The process, which draws the condensate from CWC (Contingency Water Container) #1062 via the electric condensate pumping unit (BPK) of the Russian water processing system (SRV-K2) to the KAV container, was started by the CDR on 2/26.

Afterwards, Williams set up the regular ITCS LTL (Internal Thermal Control System/ Low Temperature Loop) coolant jumper connection to the LAB1D6 rack in support of ground-commanded activation of the U.S. CDRA (Carbon Dioxide Removal Assembly) at ~1:40am EST.

CDRA operation supports the regeneration of spent EMU METOX (Metal Oxide) CO<sub>2</sub> absorption canisters that Williams initiated later in the day in the U.S. Airlock.

Sunita Williams performed an SSRMS OBT (Space Station Remote Manipulator System Onboard Training) run using the "ROBot" robotic simulation/training equipment, intended for honing proficiency for upcoming 13A activities (now slipped to at least end of April). *[The equipment was first transferred from the Node to the Lab, followed by reconnection of the cables for the RHC (Rotational Hand Controller), THC (Translational HC) and the SSC (Station Support Computer) set aside for Simulation ops. She also configured the A31p laptops and powered up the system, recording the time requirements involved for all steps to provide actual times for better future timeline planning.]*

Mikhail Tyurin had an hour reserved for more post-EVA-17A clean-up ops, specifically, relocating hardware from temporary stowage in the SM & FGB back to the DC1 (Docking Compartment) and SM PkhO (Transfer Compartment). *[Transfers to the DC1 included the CRYOGEM-03 cooler, which Misha deactivated in the SM and turned on again in the DC1 at a thermostatic setting of +20 degC, the BIOTREK experiment (BIOEKOLOGIA kit #6) and the ANTIGEN experiment (BIOEKOLOGIA kits #4 & #5). The new setups were photo documented.]*

The FE-1 also serviced the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), changing out its AST spectrometer's PCMCIA memory card after ascertaining the size of the recorded data on it, then resetting (cleaning) data from two previous cards for future ops studying space radiation in the ISS RS. *[ALTCRISS uses the AST spectrometer employed by VC8 guest cosmonaut Roberto Vittori in 2005 in the DC1 for the Italian LAZIO (Low Altitude Zone/Ionization Observatory) experiment.]*

After the CDR prepared the auditory test equipment, each crewmember took the periodic on-orbit hearing assessment (O-OHA) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC (Medical Equipment Computer) laptop application. It was L-A's fifth, Misha's fourth, and Suni's third session. *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using*

*individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month. Note: There have been temporary hearing deficits documented on some U.S. and Russian crewmembers, all of which recovered to pre-mission levels.]*

Before sleep time, the FE-1 unstowed and installed the equipment for the periodic Russian MO-10 "Hematokrit" testing that is scheduled tomorrow for all three crewmembers. *[MO-10 measures the hematocrit (red blood cell mass) value of the blood (it is a well-known phenomenon of space flight that red blood cell mass {normal range: 30-45%} tends to go down over time).]*

The FE-1 started the recharge process on the first set of two NiMH (Nickel Metal Hydride) batteries for the PZE STIMUL-01 payload in the payload's charger device. *[In the last few days, the NiMH batteries were first discharged for maintenance.]*

Mike L-A completed the weekly audit/inventory of the available CWCs (contingency water containers) and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

Mikhail Tyurin serviced to the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, by taking the periodic photography of the setup with the Nikon-D1X camera, including the growth of the barley and pea seeds in the Lada-10 greenhouse. The images were then copied to the RSK1 laptop for subsequent downlink to TsUP-Moscow via BSR-TM or OCA. Working off his Russian "time permitting" discretionary task list, the FE-1 additionally performed the periodic status check on the Rasteniya-2 payload.

Also from the voluntary task list, Tyurin conducted the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A third task at Misha's discretion was another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with the 400 mm focal length lens to take pictures of natural environment targets. *[Specific target areas today were the Caucasus mountain range with the Kolka*

*Glacier, the Caspian Sea, the Volga River and the Aral Sea, plus industrial & natural coastal regions of Greece, and the Carpathian mountains.]*

Sunita performed the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Suni also undertook the routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Later, the FE-2 completed the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copied L-A's, Misha's, and her own exercise data file to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~3:45am EST, CDR Lopez-Alegria held a discretionary private conference via Ku-band/video & S-band/audio.

At ~8:05am, Mike L-A and Sunita conducted two outstanding interactive TV interview exchanges with PAO clients: WBZ Radio in Boston, MA, and USINFO (U. S. State Department) in Washington, D.C.

*Note on Mission ISS-13A:* Due to damage sustained by the Shuttle External Tank and some by the Orbiter from a severe hail storm at KSC last Monday (2/26), the Atlantis will be rolled back this week to the VAB. A new launch date for STS-117 has not been determined yet, but teams will focus on preparing for liftoff in late April.

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window,

were **Cairo, Egypt** (*Cairo, Arabic for "The Triumphant", is the capital city of Egypt. With a population of approximately 11.1 million people, Cairo is the most populous city in Africa and the twenty-first most populous city in the world. As might be expected, such a concentration of people does not come without environmental problems. The crew was to do a mapping pass which shows detail within the city itself. Interest is also on the land use surrounding the city. Center point is 30.03N, 31.35E*), and **Georgia Coastal Ecosystems** (*the GCE study area is a barrier island and marsh complex located on the central Georgia coast in the vicinity of Sapelo Island and the Altamaha River, one of the largest and least developed rivers on the east coast of the United States. Specific research topic: Influence of river flow and ground-water discharge variability on transport and exchange processes in salt-marshes and tidal creeks. Documenting land use. Center point is 31.43N, 81.37W.*)

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 10:46am EST [= epoch]*):

Mean altitude -- 333.9 km

Apogee height -- 347.7 km

Perigee height -- 320.1 km

Period -- 91.21 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020556

Solar Beta Angle -- -32.1 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 112 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47363

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

03/02/07 -- ISS reboost for 13A (3:12am; single-burn; delta-V~2 m/s; t~550 sec);

03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM), i.e., on CMGs;

04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)

04/09/07 -- Soyuz TMA-10/14S docking (SM aft port, 3pm)

04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) & landing (6-9am)

TBD (end-04/07)-- STS-117/13A launch -- S3/S4 trusses (6:43am) -- NET

TBD (end-04/07) -- STS-117/13A docking (2:10am)

TBD (end-04/07) -- STS-117/13A undocking (10:05 pm)  
TBD (end-04/07) -- STS-117/13A landing @ KSC (2:05am)  
05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
05/05/07 -- SM reboost engine test  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking  
07/09/07 -- STS-118/13A.1 undocking  
07/12/07 -- STS-118/13A.1 landing  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/27/07  
**Date:** Tuesday, February 27, 2007 2:01:10 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/27/07**

All ISS systems continue to function nominally, except those noted previously or below.

ISS crew work/rest cycle: wake-up last night 9:00pm EST; sleep 12:30pm today.  
*[Next wake-up: 9:00pm tonight; sleep: 12:30pm tomorrow.]*

The station residents began their workday by completing another post-EVA session with the Russian crew health-monitoring program's medical assessment MO-9/ Biochemical Urinalysis before breakfast & first exercise. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

CDR Lopez-Alegria and FE-2 Williams completed the second day of the regular six-month IFM (inflight maintenance) work on the TVIS (Treadmill with Vibration Isolation & Stabilization), including detailed chassis inspections, roller bearing assembly changeout, and flywheel & transfer case lubrication. *[Today's work entailed removal of the treadmill from the SM "pit", disassembly of forward components such as the flywheel case and transfer case, lubrication of both of their splines and reinstallation of the components, inspection of the gyroscope and aft TVIS components, replacement of the electronic box battery (for maintaining TVIS time & date), checkout of the SPDs (Subject Positioning Devices; aft/right wire rope exhibiting some wear), replacement of four forward/left wire ropes, other general inspections, and reinstallation of the treadmill in the SM floor. An unmanned 20-min speed characterization test successfully concluded the activities. Total time for two days reserved for both L-A and Suni: 16 hrs.]*

Before doing her exercise today on the TVIS in its new configuration (which includes a new control panel, multi-use bracket {"Bogan Arm"} and a table), Sunita Williams set up the video equipment to record a tape of her run for engineering evaluation. Afterwards, the video gear was stowed. *[An evaluation run on the RED (Resistive Exercise Device) is scheduled for Thursday (4/1).]*

In the DC1 (Docking Compartment), the CDR started the discharge process on the second 825-3M Orlan storage battery packs (of two).

The FE-1 unpacked the second set of two NiMH (Nickel Metal Hydride) batteries for the PZE STIMUL-01 payload and initiated the discharge process in the payload's charger device.

A major part of Mikhail Tyurin's work today was the reintegration of the Progress M-59/24P cargo vehicle at the DC1 (Docking Compartment) into the ISS RS (Russian segment). Last week, for EVA-17A, 24P had been prepared for the eventuality that it may have had to be undocked. *[After concluding the obligatory leak check of the DC1-to-24P tunnel/vestibule, Tyurin opened the vestibule hatches (DC1-SU & SU-24P) and installed the Q/D (quick disconnect) screw clamps (SSVP). 24P was then deactivated and the ventilation air duct installed in the interface passage. For the purpose of leak check and SSVP install, RS (Russian segment) thrusters were temporarily disabled and automatic handover to the RS inhibited (12:00am – 2:05am EST), with the U.S. CMGs remaining in control. Misha then concluded the reintegration of the cargo vehicle by unbolting and removing the SSVP docking mechanism in the hatchway between 24P and the DC1, to allow access for trash loading.]*

After yesterday's procedures review, Tyurin today readied the requisite tools & equipment for the upcoming major IFM (inflight maintenance) on the two SM air conditioners. *[R&R (removal & replacement) of the SKV1 heat exchanger unit (BTA) will be performed on 3/1 (Thursday), preceded tomorrow by the necessary venting of the Khladon-218 coolant (Russian for Freon-218). Both air conditioners (SKV1, SKV2) will also be equipped with new noise suppression hardware, scheduled for 3/2 (Friday).]*

Also in preparation for the SKV outfitting, the FE-1 conducted noise level measurements in the station interior, using the U.S. SLM (sound level meter) for a 50-min acoustic survey to gage background noise before the planned installation of new SKV sound deadening gear. The SLM data were then transferred to the MEC (Medical Equipment Computer) for subsequent downlink and the data take closed out, with ground specialists standing by for tagup as necessary.

Tyurin completed the routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables and today also terminating, on TsUP Go-ahead, the flushing of the new purification column assembly (BK BKV) that he had installed in the SRVK-2M water conditioning system yesterday.

Later, working off his Russian "time permitting" discretionary task, Misha undertook the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Also from the voluntary task list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A third task at his discretion was another session with the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with the 400 mm focal length lens to take pictures of natural environment targets. *[Specific target areas were the Volcano Fujiyama in Japan, Vladivostok and Sakhalin, Pamir and Medvezhy Glacier plus other glaciers to the west, the S. Caspian Sea and the Aral Sea.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-1), TVIS treadmill (FE-2), and the RED resistive exercise device (CDR, FE-1, FE-2).

Afterwards, Mike L-A copied Misha's, Suni's and his own exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

A 10 mmHg N<sub>2</sub> (nitrogen) repressurization was performed today from U.S. Airlock tanks to increase total cabin pressure. The CDR also supported an O<sub>2</sub> (oxygen) atmosphere refresh from Progress M-58/23P storage (SrPK).

At ~10:45am EST, L-A and Suni held a 30-min teleconference with the STS-117/13A Shuttle crew.

*EPS PPL Correction Update:* Overnight, ground teams successfully loaded the proper EPS PPL (Electrical Power System/Pre-positioned Load, #195/Vers. 4004) on the C&C MDM (Command & Control Multiplexer/Demultiplexer) computers, on EEPROM (Electrically Erasable Programmable Read Only Memory) and DRAM (Dynamic Random Access Memory). This corrects the erroneous earlier software load, reported yesterday.

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Tropical Cyclone Gamede** (*DYNAMIC EVENT: This strong Category 3 Tropical Cyclone continues to menace the island of Madagascar. After moving westward yesterday, it has pulled up stationary and is forecast to begin a turn to the southwest at the time of this ISS pass near 19.0S 52.3E. This is a large system with classical cloud structure and a small eye. As the station tracked northeastward across the southwest coast of Madagascar, the crew was to begin looking right of track for this system. Documenting the storm's size and structure in oblique views with short lens settings, 50mm or less*), **Bosumtwi Impact Crater** (*Bosumtwi impact crater is a fairly young impact crater, dated at 1.07 million years. Similar to Lonar crater in India, this impact crater is also filled by a lake. Crater diameter is 10.5 km. Lake Volta is the large reservoir that the crew probably noticed first. Bosumtwi is located in Ghana, almost directly west of Lake Volta. The crater was slightly right of track*), and **Lake Poopo, Bolivia** (*The fluctuation of water levels in Lake Poopo is a good indicator of the seasonal wetness of the local climate. Over the years researchers have observed that during El Niño events the lake fills with water. Trying to document the entire lake in one frame*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 11:58am EST [= epoch]*):

Mean altitude -- 334.0 km

Apogee height -- 347.8 km

Perigee height -- 320.2 km

Period -- 91.21 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020577

Solar Beta Angle -- -27.7 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47348

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

03/02/07 -- ISS reboost for 13A (3:12am; single-burn; delta-V~2 m/s; t~550 sec);  
03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM), i.e., on CMGs;  
03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)  
03/17/07 -- STS-117/13A docking (2:10am)  
03/23/07 -- STS-117/13A undocking (10:05 pm)  
03/26/07 -- STS-117/13A landing @ KSC (2:05am)  
04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (SM aft port, 3pm)  
04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) & landing (6-9am)  
05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
05/05/07 -- SM reboost engine test  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking  
07/09/07 -- STS-118/13A.1 undocking  
07/12/07 -- STS-118/13A.1 landing  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
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Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch

01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/26/07  
**Date:** Monday, February 26, 2007 1:35:03 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/26/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 23 of Increment 14.*

The ISS crew's work/rest cycle remains unchanged: wake-up 9:00pm EST last night; sleep 12:30pm today. *[Next wake-up: 9:00pm tonight; sleep: 12:30pm tomorrow.]*

Before breakfast, CDR Lopez-Alegria, FE-1 Tyurin & FE-2 Williams performed the Russian biomedical routine assessments of Calf Volume Measurement (PZEh-MO-7) and Body Mass Measurement (PZEh-MO-8), 5<sup>th</sup> time for Suni, 11<sup>th</sup> time for L-A and Misha, using the IM mass measurement device, later breaking it down for stowage.

Afterwards, Lopez-Alegria and Tyurin performed final post-EVA clean-up tasks in the "Pirs" Docking Compartment (DC1) and Service Module (SM), with L-A removing & stowing the BNP portable oxygen (O<sub>2</sub>) repress tank from the SM RO (Work Compartment) and starting -- later terminating -- the discharge process on the first 825-3M Orlan storage battery packs (of two), while Mikhail completed systems reconfiguration and tool stowage in DC1 and SM PkhO (Transfer Compartment). Ground specialists stood by for tagup support as desired.

FE-2 Williams performed the scheduled monthly inspection of the RED (Resistive Exercise Device) with canister cords and accessory straps as well as the canister bolts for re-tightening if required.

Later, the CDR worked on the RED tie-down harness to remove and replace a cord which earlier this month was discovered to have some thimble damage.

After their detailed procedures review on 2/23, the CDR and FE-2 today began the scheduled six-month IFM (inflight maintenance) work on the TVIS (Treadmill with

Vibration Isolation & Stabilization), including detailed chassis inspections, roller bearing assembly changeout, and flywheel & transfer case lubrication. Work went well. *[Today's scheduled work accomplished chassis inspection and replacement of 10 center roller bearings on each side of the truss. Afterwards, the TVIS was returned to its original "safe" configuration (so not to leave an inoperable TVIS in the event of a timeline change). Tomorrow, the work schedule will entail treadmill removal from the SM "pit", disassembling forward components such as the flywheel case and transfer case, lubricating both of their splines and reinstalling the components, inspecting the gyroscope and aft TVIS components, replacing the electronic box battery, inspecting the SPDs (Subject Positioning Devices), other general inspections, and reinstalling the treadmill in the SM floor. An unmanned 20-min speed characterization test will conclude the activities. Total time for two days required for both L-A and Suni: 16 hrs.]*

The CDR and FE-1 conducted the standard 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, using their DCS760 digital still cameras with 400 & 800mm lenses at SM windows 6 & 8 to take imagery of documented CEO (Crew Earth Observation) targets using manual focusing only. At ~4:00am EST, L-A downlinked the obtained images to the ground for analysis. The skill training prepares the crew for the bottom side mapping of the Orbiter at the arrival of STS-117/13A on 3/17. *[During the RPM at ~600 ft from the station, L-A and Misha will have only ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Orbiter, to be downlinked for launch debris assessment. Thus, time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

Tyurin unpacked the first set of two NiMH (Nickel Metal Hydride) batteries for the PZE STIMUL-01 payload and initiated the discharge process in the payload's charger device.

Afterwards, the FE-1 unstowed and set up the equipment for another scheduled "Urolux" biochemical urine test (PZE MO-9). *[MO-9 is conducted regularly every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for US crewmembers for IMG (Integrated Medical Group) PHS evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. The data are then entered in the Medical Equipment Computer (MEC)'s special IFEP software (In-Flight Examination Program).]*

Tyurin and Lopez-Alegria spent half an hour on a review of procedures for the upcoming R&R (removal & replacement) of the heat exchanger (BTA) of one of the two Russian air conditioners (SKV-1), supported by ground specialist tagup. *[The lengthy IFM will entail equipment/tool search tomorrow, venting the Khladon-218*

*coolant (Russian for Freon-218) from the air conditioner on 2/28 (Wednesday), and performing the R&R on 3/1 (Thursday).]*

Later, the CDR started the regular processing of condensate water for the Elektron oxygen generator, using U.S. Lab-collected water from CWC (Contingency Water Container) #1062 via the electric condensate pumping unit (BPK) of the Russian water processing system (SRV-K2) to the KAV container.

Mike L-A performed the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

L-A also undertook the routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

In addition, the CDR completed the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Working off his Russian "time permitting" discretionary task list, the FE-1 performed the periodic status check and water tank recharge, as required, on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

Also from the voluntary task list, Misha Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-1, FE-2) and RED (CDR, FE-1, FE-2).

Afterwards, L-A copied Misha's, Suni's and his own exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*EPS PPL Correction:* An effort is underway to replace an erroneous EPS PPL (Electrical Power System/Pre-positioned Load) currently loaded on the C&C MDM (Command & Control Multiplexer/Demultiplexer) computers. The software is a pre-12A version that does not recognize P4 systems or active MBSUs (Main Bus Switching Units) and cannot perform effective automatic load shedding, i.e., power-down (however, manual load shedding remains unaffected). An integrated test was performed over the last weekend to check out the load procedure, and the new loading is planned for tonight if the testing is completed. Teams are looking at PPL versions in all MDMs to ensure correct config for 13A.

*Cabin Atmosphere Repressurization:* A station repress with nitrogen (N<sub>2</sub>) to increase total atmospheric pressure by ~10 mmHg is planned for tomorrow.

*Lost Russian "Glisser" Camera Bracket:* No update yet.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 2:49am EST [= epoch]*):

Mean altitude -- 334.1 km

Apogee height -- 347.9 km

Perigee height -- 320.3 km

Period -- 91.21 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020577

Solar Beta Angle -- -23.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47326

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

02/26-27/07 -- TVIS 6-month maintenance (underway)

03/02/07 -- ISS reboost for 13A (3:12am; single-burn; delta-V~2 m/s; t~550 sec);

**[burn data added]**

03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM), i.e., on CMGs;

03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)  
03/17/07 -- STS-117/13A docking (2:10am)  
03/23/07 -- STS-117/13A undocking (10:05 pm)  
03/26/07 -- STS-117/13A landing @ KSC (2:05am)  
04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)  
04/09/07 -- Soyuz TMA-10/14S docking (SM aft port, 3pm)  
04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) & landing (6-9am)  
05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
05/05/07 -- SM reboost engine test  
08/15/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch  
06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking  
07/09/07 -- STS-118/13A.1 undocking  
07/12/07 -- STS-118/13A.1 landing  
07/13/07 -- FGB solar array retraction  
07/20/07 -- Progress M-60/25P undocking & reentry  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
09/07/07 -- STS-120/10A landing  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/25/07  
**Date:** Sunday, February 25, 2007 12:46:18 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/25/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for the Expedition 14 crew of CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams. Ahead: Week 23 of Increment 14.*

The ISS crew's work/rest cycle has stabilized over the weekend: Wake-up at 9:00am EST, sleep time at 12:30pm. *[Wake-up: 9:00pm (tonight); sleep time: 12:30pm (tomorrow).]*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, FE-1 Tyurin performed preventive maintenance cleaning on the SM ventilation system's four filters (PF1-4), as well as on the V1, V2 & V3 fan screens in the DC1 Docking Compartment.

FE-2 Williams completed today's routine maintenance of the SM's SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

Working off his Russian "time permitting" discretionary task list, the FE-1 performed the periodic status check and water tank recharge, as required, on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted

barley and pea seeds in the Lada-10 greenhouse.

Also from the voluntary task list, Misha Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A third discretionary job on the “free time” listing for Mikhail was a checkout and test run of a software application on the Russian Laptop 3 for upcoming testing of ASN-M Satellite Navigation System data downloading. *[The onboard ASN-M system, Russia’s equivalent of the U.S. GPS, will be required for the arrival of the European ATV (Automated Transfer Vehicle) “Jules Verne” later this year (nominally in July).]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Williams disconnected the fuse of the TVIS, in preparation for the major 6-month maintenance of the treadmill starting tomorrow.

Students and team participating in the latest EarthKAM run, terminated yesterday, uplinked their gratitude to the crew. The teams received a total of 855 E-K images.

The CDR and FE-2 had their weekly PFCs (Private Family Conferences), L-A at ~11:00am, Suni at ~10:20am EST.

At ~2:00am EST, the crew downlinked special congratulatory greetings to Academician Boris Yevseyevich Chertok for his upcoming 95<sup>th</sup> birthday on March 1 (Thursday). The downlink will be played at the birthday celebration at RSC-Energia’s GONTI (State Science & Technology Institute) Auditorium after a speech by Energia President N.N. Sevastianov and a film dedicated to B.Ye. Chertok. *[A much-honored Hero of Socialist Labor and Laureate of Lenin and State prizes, Dr. Chertok, an Academician of the Russian Academy of Science, began his career as an electrician in 1930 at an aviation factory in Fili near Moscow. Thirty years later, he was deputy to the founding figure of the Soviet space program, the mysterious “glavnyi konstruktor” (Chief Designer) Sergey Pavlovich Korolev. Chertok’s name, too, remained a state secret throughout most of his career; when he did occasionally write for the public, he used the pseudonym “Boris Yevseyev”. Chertok’s sixty-year-long career and the many successes and failures of the Soviet space program constitute the core of his remarkable four-volume memoirs “Rakety i liudi”, currently being published by NASA’s History Office and Space Operations*

*Mission Directorate in an outstanding English version, "Rockets and People". Chertok is considered one of the founders of Cosmonautics who in his later years became a teacher, both in science and spirit, also a historian, philosopher and "invisible cosmonaut who overcame space and time" (RSC-E). From NASA, too: Three cheers to Boris Yevseyevich! Many more healthy and energetic years for you! After all, 95 years on Earth equal only 50 on a Martian calendar!]*

*Correction of yesterday's ISS long-distance record: The covered distance of ~1.995 billion km (~1.247 billion miles) does not represent 20 times the trip to Mars and back, but half that, i.e. 20 times the one-way distance.*

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:24am EST [= epoch]*):

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Perigee height -- 320.4 km

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Eccentricity -- 0.0020616

Solar Beta Angle -- -18.6 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 85 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47314

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

02/26-27/07 -- TVIS 6-month maintenance

03/02/07 -- ISS reboost (delta-V~2.1 m/s);

03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM), i.e., on CMGs;

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08/02/07 -- PMA-3 relocation  
08/15/07 -- Progress M-60/25P undocking (DC1) & reentry  
08/16/07 -- Progress M-61/26P launch  
08/18/07 -- Progress M-61/26P docking (DC1)  
08/26/07 -- STS-120/10A -- Node 2 launch  
08/28/07 -- STS-120/10A -- Node 2 docking  
09/04/07 -- STS-120/10A undocking  
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10/01/07 -- Progress M-61/26P undocking (DC1)  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/24/07  
**Date:** Saturday, February 24, 2007 12:49:18 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/24/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams, except for regular maintenance and voluntary work. >>>Today at ~11:00am, ISS completed **47,300 orbits** of Earth since launch of FGB/Zarya eight and a half years ago, having covered a distance of 1.995 billion km (1.247 billion miles) or ~20 times the distance to Mars and back.<<<*

The ISS crew's work/rest cycle is stabilizing over the weekend: Wake-up at 9:00am EST, sleep time at 12:30pm. [*Wake-up: 9:00pm (tonight); sleep time: 12:30pm (tomorrow).*]

CDR Lopez-Alegria and FE-1 Tyurin completed final post-EVA cleanup activities. They -

- removed oxygen tanks (BK3), telemetry systems (BRTA) and 825-3M batteries from the Orlan-M suit backpacks,
- refilled the spacesuits' feedwater bladders with water,
- arranged the Orlans in the DC1 (Docking Compartment) to dry out during the day's course,
- configured the BSS interface units and Orlan suits, after drying, for storage and then stowed them, and
- returned the DC1 comm systems to their normal configuration.

Tyurin also took the monthly sensor readings of the Russian "Pille-MKS" radiation dosimetry experiment, which has ten sensors placed at various locations in the Russian segment (port cabin window, starboard cabin window, ASU toilet facility, control panel, etc.), leaving the reader powered up and calling the dosage data to TsUP/Moscow after post-EVA cleanup ops.

Session 2 for Increment 14 of the EarthKAM (Earth Knowledge Acquired by Middle School Students) experiment from the University of California in San Diego/UCSD

(and the 25<sup>th</sup> time aboard the ISS) concluded today, with Science Officer Sunita Williams shutting down, disassembling and stowing the hardware (the latter on her “job jar” task list). EarthKAM locked up last night during crew sleep and was later restarted by Williams from the SSC5 (Station Support Computer 5) desktop.

*[EarthKAM was activated on 2/19, with its main objective being to continue getting students interested in math and science and to inspire this next generation of explorers. This time, a total of 98 schools participated, 89 from the US, 2 each from Argentina and Japan and one each from Canada, France, Germany, South Korea, and Spain, involving a total of 6383 students. The payload ran without crew intervention (except for the lens change), using a Kodak ESC 460C electronic still camera with 50mm or 180 mm lens, powered by 16Vdc from a 28 Vdc adapter, taking pictures by remote operation from the ground. It is available for students who submit image requests and conduct geographic research. The requests were uplinked in a camera control file to the IBM A31p SSC laptop which then activated the camera at specified times and received the digital images from the camera's storage card on its hard drive, for subsequent downlink via OpsLAN.]*

The FE-2 also performed the daily routine maintenance of the SOZh environmental control & life support systems in the SM, including ASU toilet facilities systems/replaceables.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Sunita copied Misha's, L-A's and her own exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his Russian “time permitting” discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

At ~3:45am EST, Suni set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 3:50am conducted a ham session with students at Vasant Valley School in Vasant Kunj, New Delhi, India. *[Vasant Valley School in New Delhi, established in 1990, is a self-financing day school with a current enrolment of 1257 in classes Foundation to Twelve. The school campus spreads over eight acres and has fully equipped Science and Computer laboratories. “Is there pollution in space due to the*

*International Space Station?"; "If a gold fish is taken up to a microgravity environment, how will the fish react to the lack of gravity as it already floats in a fish tank?"; "Can a Black Hole swallow another Black Hole?"; "What happens to a bullet fired in space?"]*

At ~8:55am EST, the crew had their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

For today's voluntary "Saturday Science" program, the two options proposed to Suni were (1) an EPO-International Polar Year (IPY) demo, to be used at the IPY kickoff events starting this month; and (2) both EPO-IPY and EPO-Communications demo (using the IPY video downlink as educational demo).

### **Weekly Science Update** (*Expedition Fourteen -- 22<sup>nd</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* Photos and data after AST spectrometer reorientation were downlinked on 2/16. Assessment of data and photos shows nominal set-up and performance of ALTCRISS.

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BASE:* Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA):* Complete.

*CBOSS (Cellular Biotechnology Support Systems):* Complete.

*CFE (Capillary Flow Experiment):* Complete.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* Two student experiments. The alfalfa and radish seeds inside CGBA-CSI were germinated on 2/15 and "are growing nicely, although a bit confused". Students also germinated their own seeds in their classrooms this week. The *C. elegans* were passaged into a new opticell with fresh media on 2/19 and appear to be doing well also. Students continue their analysis of the growth rates.

*CULT (Cultural Factors Questionnaire):* Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test):* Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* L-A and Suni were thanked for helping organizers get in an additional EarthKAM session this Increment and for their “diligence in keeping EarthKAM running this week”. 98 schools participated, involving over 6000 students. Over 900 images downlinked to date.

*EPO (Educational Payload Operation):* Complete.

*ETD (Eye Tracking Device):* Complete.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology):* Planned

*GRAVI (Threshold Acceleration for Gravisensing):* Complete.

*IMMUNO (Saliva Sampling):* Complete.

*LEUKIN:* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 “Pirs”.

*NOA (Nitric Oxide Analyzer):* Complete.

*Nutrition:* Planned.

*PK-3 (Plasma Crystal 3):* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* A teleconference was held regarding the PMDIS hardware stability issue, as reported by Mike L-A. Researchers reached a conclusion for a workaround and will notify the CDR when appropriate.

*POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G):* Complete.

*RC (Refrigerated Centrifuge):* Planned.

*RS (Renal Stone):* Planned.

*SAMPLE*: Complete.

*SEM (Space Experiment Module)*: Complete.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight)*: “Suni, Thanks for downloading and re-initializing the watches this week. We greatly appreciated the video, too!”

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite)*: In progress.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft)*: Planned.

*TRAC (Test of Reaction & Adaptation Capabilities)*: Planned.

*TROPI (Study of Novel Sensory Mechanism in Root Phototropism)*: Complete.

*YING (Yeast in No Gravity)*: Complete.

*CEO (Crew Earth Observations)*: Through 2/18 the ground has received a total of 4,286 of ISS/CEO images for review and cataloging. This week researchers received new imagery with times corresponding to the following target requests: Somalia Coast; Addis Ababa, Ethiopia; N. Mariana Islands & Guam; Hyderabad, India; and Tropical Storm Fabio. “We will be reviewing and cataloging these sessions and providing you our feedback in the coming days. Your striking image taken last month of Montreal in morning sunlight and a dusting of snow will be published on NASA/GSFC’s Earth Observatory website this weekend”.

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Dhaka, Bangladesh** (*Dhaka is the capital of Bangladesh. It is located on the banks of the Buriganga River. The metropolitan area has a population of 11 million, making it the largest city in Bangladesh and one of the most populous cities in the world. Because of its population and location there probably was haze in the area, but the orbital viewing may have been nadir enough to still get good images. It is difficult for researchers to judge the opacity of the haze on a day-to-day basis. Documenting city land use as well as land use surrounding the city. Mapping pass. Center point is 23.7N, 90.32E*), and **Vredefort Impact Crater** (*Vredefort is one of the oldest [>2 billion years old] exposed impact craters. This highly eroded crater resembles half of a ring structure. ISS track should have passed directly over the crater. There probably were no cloud-free conditions; however, the crew may have been able to detect the structure through holes or gaps in the clouds.*

*Researchers have images of this crater taken with the 250 mm lens, but few taken with longer lenses. Center point for this target is 27.05S, 27.5E).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

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**ISS Orbit** (*as of this morning, 11:13am EST [= epoch]*):

Mean altitude -- 334.3 km

Apogee height -- 348.2 km

Perigee height -- 320.4 km

Period -- 91.22 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.00209652

Solar Beta Angle -- -14.1 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 20 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47300

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

02/26-27/07 -- TVIS 6-month maintenance

03/02/07 -- ISS reboost (delta-V~2.1 m/s);

03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM), i.e., on CMGs;

03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)

03/17/07 -- STS-117/13A docking (2:10am)

03/23/07 -- STS-117/13A undocking (10:05 pm)

03/26/07 -- STS-117/13A landing @ KSC (2:05am)

04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12, 1:31pm)

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06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch  
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Late Oct/early Nov -- US EVA-10,-11,-12  
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01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/23/07  
**Date:** Friday, February 23, 2007 12:48:18 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/23/07**

All ISS systems continue to function nominally, except those noted previously or below.

The ISS crew's work/rest cycle was adjusted again: Wake-up at 1:00am EST, sleep time at 12:30pm. *[Wake-up: 9:00pm (tonight); sleep time: 12:30pm (tomorrow).]*

After yesterday's successful EVA-17A, Mike Lopez-Alegria and Mikhail Tyurin performed post-EVA cleanup activities:

- Returning the medical first-aid kits from the SM PkhO (Service Module/ Transfer Compartment) and DC1 (Docking Compartment) to their regular stowage locations;
- Recording radiation readings from the suit-worn plus background "Pille-MKS" dosimeters and transferring the sensors to their regular sites; also retrieving the ID-3 personal dosimeter from Tyurin's Orlan and re-attaching it on his flight outfit for constant wear;
- Breaking down and stowing the MO-9 "Urolux" hardware, used by both spacewalkers for pre- and post-EVA urine analysis;
- Opening the RO-PrK hatch in the SM between Progress 23P and the SM (without leak check);
- Closing out the DC1 (securing the returned SKK #5 exposure cassette; returning communications systems settings to nominal configuration); and
- Closing out and reconfiguring the EVA photo cameras

Later, the CDR downlinked the photo imagery from the EVA to the ground.

Both spacewalkers tagged up with ground specialists for the standard post-EVA debrief, via S-band). During a subsequent RGS (Russian Ground Site) comm window, L-A and Mikhail also discussed Orlan spacesuit particulars.

FE-2 Williams meanwhile disconnected the UOP DCP (utility outlet panel/display &

control panel) bypass power cable at the Lab RWS (Robotics Work Station) and then performed/monitored the post-EVA repress of the cabin atmosphere with O<sub>2</sub> (oxygen) from Progress M-58/23P.

Afterwards, Sunita collected the periodic cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

The FE-2 also used the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit) for the regular atmospheric check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide). Batteries were to be replaced if necessary. *[CSA-CP measurements were gathered with the new 12A.1 units #1051 (prime) & #1044 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1003 for CO<sub>2</sub> in Service Module (SM) and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1051, and returned to their regular locations.]*

L-A completed the weekly audit/inventory of the available CWCs (contingency water containers) and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

With the U.S. CDRA (Carbon Dioxide Removal Assembly) deactivated by ground commanding early this morning (~1:31am) and no longer requiring active cooling, Suni disconnected the bypass jumper from the LAB1D6 rack to the ITCS LTL (Internal Thermal Control System/Low Temperature Loop).

The FE-2 also conducted the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Later, Sunita performed the regular bi-monthly reboot of the OCA Router SSC (Station Support Computer) laptop.

The CDR and FE-2 had an hour reserved to review uplinked procedures and gather tools required for the extensive periodic TVIS treadmill six-month maintenance

scheduled for next Monday & Tuesday (2/26-27) which includes detailed chassis inspections, roller bearing assembly changeout, and flywheel & transfer case lubrication. *[Preparations, chassis inspection and replacement of 10 center roller bearings on each side of the truss will be done on the first day, with the TVIS then to be returned to its original "safe" configuration (so not to leave an inoperable TVIS in the event of a timeline change). The second day will feature TVIS removal from the SM "pit", disassembling forward components such as the flywheel case and transfer case, lubricating both of their splines and reinstalling the components, inspecting the gyroscope and aft TVIS components, replacing the electronic box battery, inspecting the SPDs (Subject Positioning Devices), other general inspections, and reinstalling the treadmill in the SM floor. An unmanned 20-min speed characterization test will conclude the activities. Total time required for both L-A and Suni: 16 hrs.]*

The FE-2 performed the daily routine maintenance of the SOZh environmental control & life support systems in the SM, including ASU toilet facilities systems/replaceables and today also the periodic checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

The crew worked out in their physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (CDR), RED resistive exercise device (FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Sunita copied Misha's, L-A's and her own exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his Russian "time permitting" discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

Also from the voluntary task list, Misha Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

At ~10:15am, the crewmembers conducted their regular weekly tagup with the Lead Flight Director at JSC/MCC-H.

At ~11:15am, the crew held their standard weekly teleconference with the JSC Astronaut Office (Steven Lindsey, via S-band S/G (space-to-ground)).

*Update on EVA-17A:* A portable bracket intended to be attached outside the DC1 for a “Glisser-M” TV camera for checking out the “Strela” GStM-2 “Strela-2” hand-cranked cargo boom, could not be located at its temporary airlock location where it had been placed before. Details are not clear yet but it appears the hardware, a telescopic metallic pole, may have drifted overboard. Efforts are underway for locating the piece.

Today's CEO (Crew Earth Observation) photo target, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, was **Irrawaddy River Delta, Burma** (*the flow of the Irrawaddy is at its lowest during the months of February and March. The upper and central portions of the delta are almost entirely under cultivation. Researchers are interested in mapping coastal changes. Mapping pass along the delta. Center point for the target box is 16.5N, 95E*), **Chongqing, China** (*with a population of 31,442,300 [2005] Chongqing is one of the megacities under CEO study. The majority of the population actually lives outside the legal limits of the city. Documenting the urban extent of the city as well as land use in and surrounding the city. Chongqing can be located at the confluence of the Yangzi and Jialingjiang Rivers. Requested was the 180 mm lens for context views for now. At a later time the 400 mm lens will be used for more detailed views. Center point is 29.5N, 106.5E*), **Yellow River Delta** (*the Yellow river delta lies along the Gulf of Bohai and is a dramatic and dynamic coastline. ISS/CEO imagery will help to document both the natural and anthropogenic land use changes leading to coastal evolution. Mapping pass along the delta. Center point for the target box is 37.5N, 118.5E*), **Lonar Impact Crater** (*Lonar impact crater is of great interest because it is the only impact crater that has been discovered so far to have impacted basaltic rock. This makes Lonar crater a great terrestrial analog for lunar craters. The crater is young, about 52,000 years old and 1.8 km in diameter. It has a shallow saline lake inside the crater. Center point is 19.96N, 76.52E*), **Nairobi, Kenya** (*Nairobi is the capital of Kenya and has the highest urban population in East Africa. The population is estimated to be between 3 and 4 million. Documenting land use both inside and outside the city. Center point is 1.42S, 36.92E*), and **Luquillo Forest, Puerto Rico** (*the Luquillo Experimental Forest [LEF] on the northeast tip of Puerto Rico, has been a center of tropical forestry research for nearly a century. In addition, the LEF is a recreation site for over a half a million people per year, a water supply for approximately 20% of Puerto Rico's population, a regional center for electronic communication, and a refuge of Caribbean biodiversity. Mapping land use. Center point is 18.32N, 65.82W*).

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**ISS Orbit** *(as of this morning, 3:24am EST [= epoch]):*

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Eccentricity -- 0.0020999  
Solar Beta Angle -- -9.5 deg (magnitude increasing)  
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Mean altitude loss in last 24 hours -- 65 m  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/22/07  
**Date:** Thursday, February 22, 2007 2:18:41 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/22/07**

All ISS systems continue to function nominally, except those noted previously or below.

The ISS crew's work/rest cycle was adjusted again: wake-up last night -- 9:05pm EST, sleep time today -- 4:00pm. *[Wake-up tomorrow: 1:00am; sleep time: 12:30pm.]*

### **Today's Russian Orlan EVA-17A from the "Pirs" Docking Compartment (DC1) was a complete success.**

After morning inspection, pre-EVA activities started out with Mike Lopez-Alegria and Mikhail Tyurin taking another MO-9 "Urolux" urine biochemistry test before breakfast. *[A second session with the Urolux equipment was conducted by both crewmembers later immediately after post-EVA station repress and RS/USOS equalization (~1:00pm).]*

ISS attitude control was handed over to the Russian segment (RS) at 2:10am EST and returned to US segment (USOS) momentum management at 6:15pm to allow thruster-effected maneuvering to EVA attitude and attitude stabilization during DC1 depressurization.

After egress at 5:27am, several minutes late, the EVA-17A spacewalk by Mike L-A and Mikhail at first encountered an unexpected difficulty with Tyurin's Orlan suit cooling when his sublimator (which dumps heat to vacuum by sublimation of an ice sheath formed in the cooler) at first did not function properly, probably due to being turned on in the lock chamber when not yet exposed to vacuum. Later, after the sublimator was deactivated and then restarted after a while, proper cooling was re-established, and Misha's fogged-over faceplate cleared up.

Despite the temporary hitch, the spacewalkers successfully completed the

retraction of the Progress M-58/23P KURS 2AO-VKA orientation antenna at the Service Module (SM) aft end port and took photographs. Using a NASA-provided cutter, Tyurin cut one of four antenna support struts, after which the dish was pulled back about six inches, safely clear of the handrail it had almost touched before, and secured with wire ties.

In addition to the antenna retraction, the CDR and FE-1 completed all other planned objectives:

- Taking photos of GTS (Global Timing System) antenna unit on SM small diameter (RO);
- Completing WAL2 antenna ops on SM (AFU/Antenna Feeder Unit for European ATV PCE/Proximity Communications Equipment: tighten latch, photos);
- Inspection of ASN-M Satellite Navigation hardware along cable routing path, with photography; plus reconfiguring HF connectors on FP18 connector patch panel;
- Photography of reflector surfaces on the MVM "Visiometer" internal & external VVT docking target for the ATV (three LSV-M Laser retro-reflectors #1, 2, 3);
- Swapping SKK-5 material exposure container for SKK-9 at SM aft end, plus photography;
- Inspecting Orleans for plume residue; wiping gloves, jettisoning towels;
- Mating "VTN-Neutron" payload hardware connectors on SM;
- Taking photographs of handrail HR2421 in the SMDP (Service Module Debris Panel) #6 installation area; also photographing the German ROKVISS experiment and TM/TC "monoblock" payload;
- Inspecting retention mechanisms & bolted joints on GStM-2 "Strela-2" cargo boom;
- Securing EVA tool "caddy" (KPU) inside DC1;
- Transferring & installing two "Yakor" foot restraints on DC1 EVA ladder.

EVA-17A ended with DC1 airlock hatch closure at 11:45am, for a total spacewalk duration of 6 hrs 18 min (15 min over timeline). *[This was the 81<sup>st</sup> spacewalk for ISS assembly & maintenance, the 53<sup>rd</sup> from the station (vs. Shuttle-based) with a total of 310 hrs 43 min, and the 20<sup>th</sup> (incl. 1 aborted) from the DC1 "Pirs" airlock. As of now, 60 NASA astronauts, 15 Russians and eight crewmembers representing Sweden (3), Japan (1), Canada (2), France (1) and Germany (1) have logged 498 hrs 3 min outside the station on building, outfitting and servicing it. During his tenth spacewalk yesterday, Mike L-A increased his standing record for cumulative spacewalk time by a U.S. astronaut to 67 hrs 40 min.]*

After ingress and DC1 airlock repressurization from SM cabin air, the crew opened

hatches and reentered the SM. After pressure equalization of the US segment (USOS) and Russian segment (RS), Sunita Williams closed the open MPEVs (Manual Pressure Equalization Valves). The USOS/RS transfer hatches could then be opened.

This was followed by the crew resetting communications, conducting ISS activation operations and restoring systems configurations in the DC1 and other RS modules to pre-EVA conditions, then installing the DC1 air ducts, drying Orlan water supply lines and deactivating the ASU toilet facility in the Soyuz TMA-9/13S spacecraft.

Earlier in the day, FE-2 Williams had shuttered the Lab science window to protect it from thruster plumes during the maneuver to EVA attitude and later opened the protective cover again to allow resumption of EarthKAM operation.

Williams also printed out newly uplinked procedures covering the TVIS treadmill 6-month maintenance routine, then went on a search for an IWIS RSU (Internal Wireless Integrated System/Remote Sensing Unit) cable, and afterwards spent another four hours on hardware prepacking for 13A Shuttle return, including taking documentary imagery of return cargo items with the photo/video equipment.

Working off his voluntary "time permitting" task list, Mikhail performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

Deactivation of the U.S. CDRA (Carbon Dioxide Removal Assembly) by ground commanding is scheduled for early tomorrow morning (~1:31am), after which the ITCS LTL (Internal Thermal Control System/Low Temperature Loop) bypass coolant jumper to the LAB1D6 rack will be disconnected.

Today's CEO (Crew Earth Observation) photo target, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, was **Goat Paddock Impact Crater** (*Goat Paddock is one other few relatively young impact craters in Australia, dated at less than 50 million years old. The crater is 5.1 km in diameter. Researchers have very few images of this crater and none taken with the 400 mm lens. Afternoon heating most likely produced popcorn cumulus clouds in the area. ISS orbital track should have shown Goat Paddock close to nadir. Center Point: 18.33S, 126.66E*), **Calcutta (Kolkata), India** (*Calcutta is located on the east bank of the river Hooghly and has a population of almost 5 million. When the metropolitan area is included, the population increases to over 14 million, making it the third-largest urban area and the fourth-largest city in India.*

*Being one of the megacities of CEO study, researchers are interested in documenting detailed areas within the city as well as the boundaries of the city and surrounding land use. Center Point: 22.5N, 88.3E), **Vredefort Impact Crater** (Vredefort is one of the oldest [ $>2$  billion years old] exposed impact craters. This highly eroded crater resembles half of a ring structure. ISS track passed directly over the crater. The crew probably did not have cloud free conditions but may have been able to detect the structure through holes or gaps in the clouds. Researchers have images of this crater taken with the 250 mm lens, but few taken with longer lenses. Center point for this target is 27.05S, 27.5E), and **Tigris-Euphrates Delta** (the Tigris-Euphrates delta has suffered environmental damage due to pollution and industrial development. Mapping coastal changes and sediment plumes entering the Persian Gulf. Center Point: 30N, 48.5E).*

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**added]**

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08/15/07 -- Progress M-59/24P undocking (DC1) & reentry **[date changed]**

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 launch

06/30/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3 docking **[added]**

07/09/07 -- STS-118/13A.1 undocking **[added]**

07/12/07 -- STS-118/13A.1 landing **[added]**

07/13/07 -- FGB solar array retraction **[added]**

07/20/07 -- Progress M-60/25P undocking & reentry **[added]**

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

08/15/07 -- Progress M-60/25P undocking (DC1) & reentry **[date changed]**

08/16/07 -- Progress M-61/26P launch **[date changed]**

08/18/07 -- Progress M-61/26P docking (DC1) **[date changed]**

08/26/07 -- STS-120/10A -- Node 2 launch **[date changed]**

08/28/07 -- STS-120/10A -- Node 2 docking **[added]**

09/04/07 -- STS-120/10A undocking **[added]**

09/07/07 -- STS-120/10A landing **[added]**

10/01/07 -- Progress M-61/26P undocking (DC1) **[date changed]**

10/02/07 -- Soyuz TMA-11/15S launch **[date changed]**

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port) **[date changed]**

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) & landing **[date changed]**

Late Oct/early Nov -- US EVA-10,-11,-12

11/??/07 -- Progress M-62/27P launch

01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/21/07  
**Date:** Wednesday, February 21, 2007 1:06:32 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/21/07**

All ISS systems continue to function nominally, except those noted previously or below.

The ISS crew's work/rest cycle was adjusted again: after wake-up last night at 11:30pm EST, sleep time today is at 12:35pm. *[Wake-up tonight: 9:05pm; sleep time tomorrow: 4:00pm.]*

FE-1 Mikhail Tyurin successfully concluded the isolation of Progress M-59/24P from the DC1 (Docking Compartment), ready to support tomorrow's EVA-17A. *[After removing the 24P docking mechanism (StM) again, the FE-1 discovered that two StM telemetry connectors were incorrectly installed (due to difficult-to-read writing on the cables). After correcting the cable configurations, the StM was re-installed and the quick-release screw clamps removed. Progress hatches (TKG-SU & SU-DC1) were closed and vestibule leak checks performed successfully. A contingency undock with automated redock of 24P if required for the EVA could now be performed (backup would be a manual redock with TORU). The remaining pre-EVA Russian Segment (RS) system reconfigurations will take place tomorrow morning (late tonight, Eastern Time). During the clamp removal and vestibule depress, Russian thrusters were disabled and automatic handover to the RS MCS (motion control system) inhibited. ]*

Continuing nominal preparations for the Orlan spacewalk, the FE-1 readied the CCPKs (Crew Contamination Protection Kits; Russian: PNST), intended to protect the spacewalkers from incompletely-burnt toxic fuel residue from thruster plumes. *[Protective gear kits for use during and after the EVA in case the Orlans are inadvertently contaminated, are extensively equipped with wet wipes, dry towels, goggles, IPK gas masks and half masks, latex gloves, high performance filters, trash containers, etc.]*

Tyurin also deactivated the Elektron oxygen (O<sub>2</sub>) generator as per nominal pre-EVA

plan.

On his part, CDR Lopez-Alegria filled the DIDBs (disposable in-suit drink bags) and installed them in the Orlans, then started recharging two DCS camera batteries, configured the EVA cameras with the proper lenses and attached a restraint for Orlan mounting. *[For sustaining one of the cameras on a power outlet until tomorrow morning, L-A had to use a power cable from the EarthKAM (E-K) camera, which was temporarily shut down (but leaving the E-K application running on SSC-5 (Station Support Computer 5).]*

Also in preparation for the EVA, the FE-1 activated the ASU toilet facility in the Soyuz for potential use by IV Sunita Williams during her EVA-17A lockout (SM-to-FGB hatches closed).

The crew conducted another in-depth review of the latest EVA timeline, tagging up with ground specialists on S-band/audio (*see Preview, below*).

Sunita Williams performed the monthly PEP (Portable Emergency Provisions) safety inspection, her third. *[The IMS (Inventory Management System)-supported inspection involves verification that PFEs (Portable Fire Extinguishers), PBAs (Portable Breathing Apparatus), QDMAs (Quick-Don Mask Assemblies) and EHTKs (Extension Hose/Tee Kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware. In the U.S. segment (USOS), there are a total of 5 PFEs and 7 PBAs, plus 7 QDMAs and 4 EHTKs. In the Node, Williams made sure that no more than three PBA bottles are stowed in the locker, to reduce the risk of getting too much oxygen concentration inside the stowage area in case of bottle leakage. The QDMA checks included tightening the fasteners if necessary (during recent Airlock "campout" operations a fastener came loose on QDMA #1010, allowing the regulator to separate from the mask. It has now been tightened properly).]*

In support of planned U.S. CDRA (Carbon Dioxide Removal Assembly) operation, Williams set up the regular ITCS LTL (Internal Thermal Control System/Low Temperature Loop) coolant jumper connection to the LAB1D6 rack. CDRA was activated by remote commanding at ~9:20am.

The FE-2 also performed the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Later, Sunita completed the periodic CSA-CP (Compound Specific Analyzer-

Combustion Products) maintenance/checkout on the prime (#1044) and backup (#1051) unit. *[Suni changed out the prime unit's battery, then zero-calibrated both instruments. Following zero calibration, the backup unit was stowed, while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

In the FGB, Suni deactivated the Ericsson ham radio equipment to prevent radio interference with the Orlan Tranzit system during the spacewalk.

Misha Tyurin retrieved three Russian "Pille-MKS" radiation dosimeters, recorded their dosages and equipped each Orlan (in pocket on left calf) with a radiation sensor (A0309 & A0310). *[The third sensor, A0307, along with an already positioned dosimeter (A0308) was placed in the SM on the PULT reader for background readings. In addition, Misha transferred his ID-3 personal dosimeter, normally worn on the flight suit, to the chest pocket of his Orlan's lining (near the DIDB), later to be returned to the flight suit. On 2/23, after the EVA, readings from all dosimeters will be recorded and downlinked.]*

Also in preparation for the spacewalk, Tyurin broke out and set up the equipment for the Russian PZE MO-9 "Urolux" biochemical urine test, scheduled for tomorrow (twice). *[The MO-9 urinalysis assessment is a standard requirement for Russian spacewalkers, both before and immediately after the EVA.]*

The CDR conducted today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Mike L-A also undertook the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A copied Misha's, Suni's and his own exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his voluntary “time permitting” task list, Mikhail performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

Also suggested on Tyurin’s “free time” task list for today was the periodic status check on the long-term BIO-5 Rasteniya-2 (“Plants-2”) micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

**Preview of EVA-17A (updated):** Tomorrow’s spacewalk by Mikhail Tyurin (EV1) and Mike Lopez-Alegria (EV2) from the DC1 will take an estimated 6 hrs 3 min, starting with EV hatch opening at ~5:00am EST and ending nominally at 11:03am EST. After final Orlan leak checks in the DC1 at ~3:20am SM & FGB hatches will be closed, followed by DC1 depress and hatch opening. Egress from DC-1: ~5:17am. There will be four orbital night periods during the spacewalk. L-A’s total EVA time will be boosted to a new record of ~67h 25min, second only after Anatoly Solovyev’s >82 hrs.

Main objectives (& anticipated completion times – for checking “ahead of/behind timeline” status):

- Taking photos of GTS (Global Timing System) antenna unit on SM small diameter (RO) (~5:28am);
- Retracting/removing Progress M-58/23P KURS 2AO-VKA orientation antenna at SM aft end port, with report & photography (~6:14am);
- Completing WAL2 antenna ops on SM (AFU/Antenna Feeder Unit for European ATV PCE/Proximity Communications Equipment: tighten latch, photos) (~7:26am);
- Inspection of ASN-M Satellite Navigation hardware along cable routing path, with photography; plus reconfiguring HF connectors on FP18 connector patch panel (~8:44am);
- Photography of reflector surfaces on the MVM “Visiometer” internal & external VVT docking target for the ATV (three LSV-M Laser retro-reflectors #1, 2, 3, if lighting conditions permit) (~9:09am);
- Swapping SKK-5 material exposure container for SKK-9 at SM aft end, plus photography (~10:00am);
- Inspecting Orlans for plume residue; wiping gloves, jettisoning towels (~10:05am)
- Mating “VTN-Neutron” payload hardware connectors on SM (~10:20am);
- Taking photographs of handrail HR2421 in the SMDP (Service Module Debris Panel) #6 installation area; also photographing the German ROKVISS experiment and TM/TC “monoblock” payload (~10:30am);

- Inspecting retention mechanisms & bolted joints on GStM-2 “Strela-2” cargo boom (~10:40am).
- Securing EVA tool “caddy” (KPU) inside DC1 (~10:45am);
- Transferring & installing two “Yakor” foot restraints on DC1 EVA ladder (~10:52am); and
- Ingressing DC1, removing protective ring, closing EV hatch 1 (~11:03am).

At 9:00am EST, ISS attitude control was handed over to the Russian MCS (SUD), followed by a thruster-effected maneuver to a specific LVLH test attitude (local vertical/local horizontal) required for conducting today's SM and FGB solar array efficiency testing. The test itself took from 9:30am to 11:50am over Daily Orbits 2-4. ISS then maneuvered back to LVLH TEA (torque equilibrium attitude) at 12:00pm, followed by control handover to the U.S. CMGs (Control Moment Gyroscopes) at ~12:30pm. *[The periodic efficiency testing keeps track of the energy-output performance of the RS photovoltaics over time under the degrading effects of the space environment (mostly from ultraviolet radiation and atomic oxygen).]*

After recent Regul telemetry system troubleshooting, TsUP/Moscow today performed a transmitter test on the Regul String 1 channel.

Today's CEO (Crew Earth Observation) photo target, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, was **Chongqing, China** (*this megacity is China's 4th largest and is located in interior southwestern China on the Yangtze River near 29.50N 106.50E. ISS had a nadir pass in unusually fair weather. Using the long lens for a detailed mapping of the urban fringes*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 4:18am EST [= epoch]*):

Mean altitude -- 334.5 km  
 Apogee height -- 348.4 km  
 Perigee height -- 320.5 km  
 Period -- 91.22 min.  
 Inclination (to Equator) -- 51.64 deg  
 Eccentricity -- 0.0020759  
 Solar Beta Angle -- -0.4 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 80 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47248

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

02/22/07 -- Russian EVA 17A (Progress antenna retraction, etc., 5:00am, 6 hrs);

03/02/07 -- ISS reboost (delta-V~2.1 m/s);

03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM), i.e., on CMGs;

03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)

03/17/07 -- STS-117/13A docking

03/24/07 -- STS-117/13A undocking

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

09/02/07 -- Progress M-60/25P undocking (DC1) & reentry

09/03/07 -- Progress M-61/26P launch

09/05/07 -- Progress M-61/26P docking (DC1)

09/07/07 -- STS-120/10A -- Node 2

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port)

Late Oct/early Nov -- US EVA-10,-11,-12

11/??/07 -- Progress M-62/27P launch

01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/20/07  
**Date:** Tuesday, February 20, 2007 1:50:29 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/20/07**

All ISS systems continue to function nominally, except those noted previously or below. >>>Today 45 years ago John Glenn became the first American in orbit, launched on a modified Atlas missile in his capsule "Friendship 7" (Mercury-6) on 20 February 1962.<<<

The ISS crew's work/rest cycle was adjusted again: after wake-up last night at 10:00pm EST, sleep time today is at 3:00pm. [Wake-up tonight: 11:30pm; sleep time tomorrow: 12:35pm.]

After their physical exercise sessions and midday break (5:55am), CDR Lopez-Alegria and FE-1 Tyurin proceeded with today's planned suited Orlan-suited dry-run exercise, which began with setting up and configuring of the video camera equipment in the DC1 (Docking Compartment) by FE-2 Williams.

Afterwards, the CDR tore down and removed the air ducts between the Service Module Transfer Compartment (SM PkhO) and DC-1, to gain room for the suited translation exercises, leaving ventilation fan V3 in.

The two spacewalkers checked out the Orlan suits, their equipment and BSS interface units via USI data output device. All EVA preps were monitored by the ground via S-Band and VHF.

Donning of EVA gear began at ~7:45am, starting with checkout of the comm hookups & biomedical parameter telemetry via the BSS interface systems and equipment monitoring, then culminating in complete ingress in the Orlans at ~8:45am and closure of backpacks. [The suited run required wireless Tranzit-B suit radio comm and temporary deactivation of the Russian VHF channel 1 (Very High Frequency, Russian: UKV1, for ultra-shortwave) to avoid interference from extraneous radio stations to the Orlans while over Russian ground stations (RGS). All EVA preps were monitored by the ground via audio.]

DC1 hatch closing (isolation) and start of partial depress for subsequent leak checks was timed at ~9:00am, followed by functionality checkout of the suits and their BSS controls, preliminary fit checks at 0.4 at (5.9 psi) suit pressure, and 50 minutes of testing/training of suited mobility and translation.

The suited mobility and translation exercises began shortly around 9:25am *[These included moving to VL1 (EVA hatch #1), translating to the POV (EVA support panel) and BSS, checking out rotation capability with and without lights on, retrieving the camera from the KPU tool carrier and stowing it temporarily on a handrail, then back in the KPU, mating electrical connectors, moving payload bundles, and operating with OTAs (Orlan tether assemblies).]*

Egress from the Orlans was timed for ~10:30am, followed by a 2h 20m period of post-training cleanup activities (changing clothes, drying out LCG, biomed harness belt, thermal undergarment, socks, comfort gloves, hygienic trunks and comm caps, remove LiOH canister and moisture collector, etc.), restoration of communications settings to nominal operation, and re-installation of the air duct between SM PkhO and DC1.

Subsequently, after the Orlans were confirmed to be dry, they were re-equipped with fresh consumables/replaceable elements for the spacewalk on Thursday (2/22).

The video cable from the DC1 to the U.S. segment was temporarily removed for crew sleep (no drag-throughs in hatches allowed during sleep time) and the video footage of the dry-run exercise was downlinked to the ground via S- & Ku-Band.

FE-2 Williams meanwhile worked a list of tasks of her own, starting with a 3-hr assignment of inventorying, stowage auditing and prepacking for return on Mission 13A, scheduled next month.

Afterwards, Sunita prepared for the next SLEEP sessions by saving data from the Actiwatches and then re-initializing the devices for herself and Mike L-A, before stowing them. *[The NASA/JSC experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the crewmembers' sleep/wake patterns and light exposure, their special Actiwatch device measure the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition.]*

The FE-2 also conducted today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

On the TVIS (Treadmill with Vibration Isolation & Stabilization), the FE-2 performed

the combined weekly and monthly maintenance, consisting of an inspection for damage of the Russian and U.S. tie-down harnesses (straps & buckles), the associated SBS (Series Bungee System) as well as the condition of the SLDs (Subject Loading Devices), SLD cables and SPDs (Subject Positioning Devices), lubricating as required, plus recording time & date values

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Sunita copied Misha's, L-A's and her own exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his discretionary "free time" task list, FE-1 Tyurin conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Also from the task list, Mikhail performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

*Docking Mechanism Anomaly:* During yesterday's installation of the docking mechanism (StM, *Stykovochnovo mekhanizma*) between Progress 24P and DC1 by Lopez-Alegria and Tyurin, an offnominal connector parameter caused TsUP/Moscow to abort the installation. This anomaly needs to be resolved before Progress undock/redock emergency ops for the EVA can be supported. More troubleshooting (~2 hr. duration), to be performed tomorrow, will involve reinstalling the StM, closing the hatch and re-doing vestibule leak checks before EVA-17A can be supported. If this is determined to be a hardware failure (as opposed to crew error in connector mating), there is a backup mechanism for the undock/re-dock contingency.

*Saturday Science Options:* Two new options for her next voluntary "Saturday Science" program (2/24) were proposed to Suni for her choice, viz., (1) the EPO-International Polar Year (IPY) demo, to be used at the IPY kickoff events starting

this month; and (2) both EPO-IPY and EPO-Communications demo (using the IPY video downlink as educational demo). Suni, L-A and Misha were also thanked by the ground for their great effort in supporting the EPO Fitness Demo on 2/17.

*EarthKAM Update:* The U.S. EarthKAM (EK) payload continues nominally in its new session (the 25<sup>th</sup> time aboard the ISS and the 2<sup>nd</sup> time on Increment 14). There are currently 97 schools participating, 88 from the US, 2 each from Argentina and Japan and one each from Canada, France, Germany, South Korea, and Spain, involving a total of 6383 students. *[EarthKAM, headquartered at the University of California in San Diego (UCSD) and originally instigated by Astronaut Sally Ride, is an education program that enables thousands of students to photograph and examine Earth from the unique perspective of space, integrating the excitement of ISS with middle-school education. EK is using a DCS 760 electronic still camera with 50mm (f/1.4) lens, powered by 16Vdc from a 28 Vdc adapter, taking pictures by remote operation from the ground, without crew interaction. The student requests are uplinked in a camera control file to an A31p SSC (Station Support Computer) laptop which then activates the camera at specified times and receives the digital images from the camera's storage card on its hard drive, for subsequent downlink via OPS LAN.]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 5:32am EST [= epoch]*):

Mean altitude -- 334.6 km

Apogee height -- 348.7 km

Perigee height -- 320.4 km

Period -- 91.22 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0021018

Solar Beta Angle -- 4.0 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 124 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47233

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

02/22/07 -- Russian EVA 17A (Progress antenna retraction, etc., 5:00am, 6 hrs);  
03/02/07 -- ISS reboost (delta-V~2.1 m/s);  
03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM), i.e., on  
CMGs;  
03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)  
03/17/07 -- STS-117/13A docking  
03/24/07 -- STS-117/13A undocking  
04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
09/02/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/03/07 -- Progress M-61/26P launch  
09/05/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port)  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/19/07  
**Date:** Monday, February 19, 2007 1:14:18 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/19/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 22 of Increment 14.*

The crew's work/rest cycle was adjusted again: after wake-up last night at 9:00pm, sleep time today is at 1:30pm EST. *[Wake-up tonight: 10:00pm; sleep time tomorrow: 3:00pm].*

Soon after beginning their workday, CDR Lopez-Alegria and FGE-2 Sunita Williams had a 30-min. S-band/audio teleconference (at 11:15pm EST) with ground specialists briefing them on 13A prepack requirements/operations.

CDR Lopez-Alegria hooked up the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable at the RWS (Robotics Work Station) for video coverage of EVA-17A preparations, including tomorrow's Orlan-suited dry-run.

Afterwards, the CDR and FE-1 Mikhail Tyurin spent some of their time on closing off access to the Progress M-59/24P cargo vehicle at the DC1 (Docking Compartment), first checking the hatch KVDs (pressure equalization valves) in the DC1 and Service Module Transfer Compartment (SM PkhO) from their EVA support panels (POV), then installing the docking mechanism (StM, *Stykovochnovo mekhanizma*) between 24P and the DC1.

Other preparatory activities included activation of 24P, setting up the usual additional portable air repress bottle (BNP) in the "Pirs" module (to support a DC1 repress in the event of a failure of the DC1/PkhO hatch's pressure equalization valve), and later installing a second BNP supplementary portable air repress bottle in the repress line of the SM's work compartment (RO).

After TsUP/Moscow uploaded a new version of the attitude control restoration program on the TVM computer in the SM, replacing the old one, the Russian

thrusters were inhibited (~10:20am) and the Progress autonomous control mode activated to allow removal of the quick-release screw clamps in the DC1 by Mike L-A and Tyurin.

Hatches to Progress were closed at ~10:50am and the transfer tunnel ("vestibule") depressurized, followed by the usual one-hour leak check by the FE-1.

L-A and Misha had another hour for reviewing procedural material for conducting an EVA from the DC1. They also modified an MUT (Multi-Use Tether) for the CDR and installed the Fresnel lens viewing aids in the Orlan helmets for EVA-17A.

Meanwhile FE-2 Williams conducted a review of the latest DOUG (Dynamic Onboard Ubiquitous Graphics) software for SSRMS (Space Station Remote Manipulator System) operations. Afterwards Sunita and Robotics flight controllers conducted the planned pre-launch checkout of the MSS (Mobile Servicing System) for flight 13A. *[With the SSRMS based on MRS MBS PDGF-3 (Mobile Remote Servicer/ Mobile Base System/Power & Data Grapple Fixture 3), Sunita maneuvered the arm to grapple and mate to PDGF-2. The arm base was then changed and powered up from the arm's LEE-B end (Latching End Effector B) by ground commanding. Afterwards Sunita maneuvered the arm to release LEE-A from PDGF-3 and get into the SVS (Space Vision System) survey position where a survey was conducted of the 13A (S3/S4 mate) target arrays on the S1 truss. Sunita then performed a checkout of RWS (Robotics Work Station) switches, after which she maneuvered the arm to the 13A docking configuration. SSRMS cameras will be used in support of the upcoming Orlan EVA-17A, after which Flight Controllers will complete the pre-launch checkout ops with a LEE-A checkout and viewing as well as some final diagnostic tests.]*

The FE-2 also worked on the MELFI (Minus Eighty Degree Laboratory Freezer for the International Space Station), inserting -32 degC ICEPAC belts in Dewar 3 with samples from her latest NUTRITION session and recording samples and locations in the IMS (Inventory Management System).

Sunita set up and activated the U.S. EarthKAM (EK) hardware for a new session (the 25<sup>th</sup> time aboard the ISS and the 2<sup>nd</sup> time on Increment 14). *[EK is using a DCS 760 electronic still camera with 50mm (f/1.4) lens, powered by 16Vdc from a 28 Vdc adapter, taking pictures by remote operation from the ground, without crew interaction. 97 schools are participating in this EarthKAM session. EarthKAM is an education program that enables thousands of students to photograph and examine Earth from the unique perspective of space, integrating the excitement of ISS with middle-school education. The student requests are uplinked in a camera control file to an A31p SSC (Station Support Computer) laptop which then activates the camera at specified times and receives the digital images from the camera's storage card on its hard drive, for subsequent downlink via OPS LAN.]*

Williams conducted the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

In the Soyuz TMA-9/13S spacecraft, docked at the FGB nadir port, FE-1 Tyurin turned off the gas analyzer (GA) via its InPU Integrated Control Panel, which he had activated on 2/14.

After removing the protective window cover on SM window #13, Mike L-A configured photo and TV equipment and recorded a survey of SAW (Solar Array Wing) 2B. Afterwards, the window cover was re-installed.

Mikhail Tyurin completed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown.]*

The cosmonaut also serviced to the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, by taking the periodic photography of the setup with the Nikon-D1X camera, including the growth of the barley and pea seeds in the Lada-10 greenhouse. The images were then copied to the RSK1 laptop for subsequent downlink to TsUP-Moscow via BSR-TM or OCA. Working off his Russian "time permitting" discretionary task list, the FE-1 performed the periodic status check on the Rasteniya-2 payload.

Also from the voluntary task list, Misha completed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

Tyurin conducted today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables.

Suni Williams took care of the daily updating/editing of the standard IMS "delta" file, tracking equipment items and stowage locations, for the regular weekly automated

export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

L-A had his weekly PFC (Private Family Conference) at ~11:20am EST.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Sunita copied Misha's, L-A's and her own exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 5:12am EST [= epoch]*):

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Apogee height -- 348.9 km

Perigee height -- 320.5 km

Period -- 91.23 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.002113

Solar Beta Angle -- 8.3 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 125 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47217

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

02/20/07 -- Russian Orlan spacesuit dry-run;

02/22/07 -- Russian EVA 17A (Progress antenna retraction, etc., 5:00am, 6 hrs);

03/02/07 -- ISS reboost (delta-V~2.1 m/s);

03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM), i.e., on CMGs;

03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)  
03/17/07 -- STS-117/13A docking  
03/24/07 -- STS-117/13A undocking  
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Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 02/18/07  
**Date:** Sunday, February 18, 2007 1:37:32 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/18/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for the Expedition 14 crew of CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams. Ahead: Week 22 of Increment 14.*

The crew's work/rest cycle was adjusted again: after wake-up last night at 9:00pm EST, sleep time today was at 12:30pm. *[Wake-up tonight: 9:00pm; sleep time tomorrow: 1:30pm].*

Lopez-Alegria worked on the ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, rebooting the EXPRESS RACK 4 (ER-4) laptop (ELC), restarting the experiment's DAU (Data Acquisition Unit) with the usual CPU (Central Processing Unit) lockup procedure and checking out the resulting ALTEA display on the ELC. *[This activity, required for the planned transition of ER-4 from power channel 4A to 2A, was conducted in two parts, separated by 15 min to allow the ALTEA software to load. Purpose of ALTEA is to define and measure descriptors for the electrophysiological brain functioning and to follow their dynamics, correlating it with space environments. ALTEA uses six particle detectors (originally introduced on Mir), a 32-channel EEG (Electroencephalograph) system, a visual stimulator and a pushbutton. These devices can be used separately or in any combination, permitting several different experiments: in physics, dosimetry, psychophysics, electrophysiology and cognitive neurophysiology.]*

FE-2 Williams completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

Working off his Russian “time permitting” discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 (“Plants-2”) micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

Also from the voluntary task list, Misha Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary “time available” task list for the duration of Expedition 14.]*

Suni had her weekly PFC (Private Family Conference) at ~11:00am EST.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

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Perigee height -- 320.7 km

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Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0020944

Solar Beta Angle -- 12.4 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 132 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47202

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

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03/02/07 -- ISS reboost (delta-V~2.1 m/s);  
03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM), i.e., on  
CMGs;  
03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/17/07  
**Date:** Saturday, February 17, 2007 1:34:23 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/17/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams, except for regular maintenance and voluntary work.*

The crew's work/rest cycle was adjusted again: after wake-up last night at 10:45pm, sleep time today was at 12:30pm EST. (Wake-up tonight: 9:00pm; sleep time tomorrow: 12:30pm).

Before breakfast, Sunita Williams began the second day of her third run with the NASA/JSC experiment NUTRITION, which today called for urine collections. *[Williams collected samples throughout the day for storage in the MELFI (Minus-Eighty Laboratory Freezer for ISS). The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing in-flight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

As part of the standard pre-EVA fitness evaluation, Mikhail Tyurin undertook the

Russian MO-5 MedOps protocol of cardiovascular evaluation during graded exercises on the VELO cycle ergometer, his fourth, assisted by Lopez-Alegria (who completed the test yesterday) as CMO (Crew Medical Officer). *[The assessment, supported by ground specialist tagup (VHF) and telemetry monitoring, uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph cuff wired to the cycle ergometer's instrumentation panels. For the graded exercise, the subject works the pedals after a prescribed program at load settings of 125, 150, and 175 watts for three minutes each. Data output involves a kinetocardiogram, rheoplethysmogram, rheoencephalogram and a temporal pulsogram.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE-1's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, FE-1 Tyurin performed preventive maintenance cleaning on the TsV1, TsV2 & VT7 ventilation system fans in the FGB as well as on the air heater screen in the Soyuz 13S.

Suni Williams reviewed making an EPO (Education Payload Operations) demo video of Onboard Fitness Training, her choice for today's voluntary "Saturday Science" program. After setting up the camcorder, she recorded the physical exercise demo session, then disassembled and stowed the hardware.

CDR Lopez-Alegria completed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

At ~6:35am EST, the crew had their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

On TsUP/Moscow "Go", the CDR was to initiate a cabin atmosphere refresh with O<sub>2</sub> (oxygen) from the M-58/23P Progress cargo ship.

In preparation for the EVA-17A spacewalk on Thursday (2/22), the FE-1 closed the

hatches between 23P at the SM aft port and the SM Working Compartment (RO)

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni transferred Misha's, L-A's and her own exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his voluntary "time permitting" task list, the FE-1 performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

At ~7:30am, Misha had his weekly PFC (Private Family Conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

### **Weekly Science Update** (*Expedition Fourteen -- 21<sup>st</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* On 2/15 the crew re-oriented the AST spectrometer, corrected the reference dosimeters set-up, exchanged memory card and made photos. All reported nominal. Photos and data to be assessed upon downlink on 2/16.

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BASE:* Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA):* Complete.

*CBOSS (Cellular Biotechnology Support Systems):* Complete.

*CFE (Capillary Flow Experiment):* Complete.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus)*: Two student experiments. The GHab (Garden Habitat) containing the seed germination experiment was to be activated from the ground on 2/16. Up to 2000 third-grade students across the US will simultaneously be growing seeds in their classrooms and measuring and observing the difference in growth rates and patterns between flight and earth grown seeds.

*CULT (Cultural Factors Questionnaire)*: Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test)*: Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM)*: In progress.

*EPO (Educational Payload Operation)*: Complete.

*ETD (Eye Tracking Device)*: Complete.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology)*: Planned

*GRAVI (Threshold Acceleration for Gravisensing)*: Complete.

*IMMUNO (Saliva Sampling)*: Complete.

*LEUKIN*: Complete.

*MISSE (Materials ISS Experiment)*: Ongoing.

*MTR-2 (Russian radiation measurements)*: Passive dosimeters measurements in DC1 "Pirs". Removal of passive dosimeters from the MATRYOSHKA Phantom was performed on 12/07 and returned on STS-12A.1.

*NOA (Nitric Oxide Analyzer)*: Complete.

*Nutrition*: Planned.

*PK-3 (Plasma Crystal 3)*: In progress.

*PMDIS (Perceptual Motor Deficits in Space)*: Planned.

*POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G)*: Complete.

*RC (Refrigerated Centrifuge):* Planned.

*RS (Renal Stone):* Planned.

*SAMPLE:* Complete.

*SEM (Space Experiment Module):* Complete.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):*  
In progress.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Planned.

*TRAC (Test of Reaction & Adaptation Capabilities):* Planned.

*TROPI (Study of Novel Sensory Mechanism in Root Phototropism):* Complete.

*YING (Yeast in No Gravity):* Complete.

*CEO (Crew Earth Observations):* Through 2/13 the ground has received a total of 4,003 of ISS CEO images for review and cataloging. Almost 97% of CEO imagery has now been cataloged. Researchers are pleased to hear that the crew is finding their feedback on CEO target acquisitions helpful and will continue to provide them with more as imagery becomes available. A late-December view of Barcelona, Spain will be published on NASA/GSFC's Earth Observatory website this weekend. This striking image was acquired using the 400mm lens with the doubler and the combination of crisp focus and favorable sun elevation reveal remarkable detail of city's urban landscape and historical development.

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Foelsche Impact Crater** (*Foelsche crater is another one of the very old [>545 million years] impact craters located in the Northern Territory of Australia. The remnant of the crater suggests a 6 km diameter and was named after the Foelsche River north of the crater. Researchers have no images of this crater in their earth observations database. Center Point: 16.66S, 136.78E*), and **Tropical Storm Favio** (SW Indian Ocean near 26.0S 55.0E. *DYNAMIC EVENT: This slowly strengthening tropical storm is forecast to threaten southern Madagascar by Monday (2/20). Although latest satellite imagery does not depict a well-organized system yet, there is potential for increased organization by the time of this ISS pass. Using a short lens setting, 50mm or less and looking well left of track for*

*oblique or panoramic views).*

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Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 117 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47186

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

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10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port)  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 02/16/07  
**Date:** Friday, February 16, 2007 2:08:34 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/16/07**

All ISS systems continue to function nominally, except those noted previously or below.

The crew's work/rest cycle was adjusted again: after wake-up last night at 9:00pm, sleep time today will be at 2:15pm EST. (Wake-up tonight: 10:45pm; sleep time tomorrow: 12:30pm).

Before breakfast, Sunita Williams began the first day of her third run with the NASA/JSC experiment NUTRITION, for which she had to forego exercising and food intake for eight hours. *[Suni started the session by collecting blood samples (assisted by CDR Lopez-Alegria), which were first spun in the RC (Refrigerated Centrifuge) and then placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. Williams also started the required 24-hour data collection by securing urine specimen during the day, also stored immediately in MELFI. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing in-flight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R*

*+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

The FE-2 also started Part 3 (of 5) of the periodic acoustic measurement protocol by recording post-sleep data of the crew-worn acoustic dosimeters, later deploying the dosimeters statically in the station for the duration of the day, then recording measurements this afternoon (~1:55pm) and stowing the instruments. *[Acoustic data must be taken twice per Increment, each time for the duration of the 16-hour crew workday.]*

In preparation for today's Orlan activities, Lopez-Alegria set up the PD-100 video camera equipment for observing the activities from the DC1 (Docking Compartment) through the Lab via U.S. Ku-band. Later in the day, the video gear was disassembled (to keep hatchways and contingency translation path free of cables during crew sleep).

In the DC1 "Pirs", the CDR and the FE-1 continued preparations for the upcoming Orlan dry run on 2/20 (Tuesday) and the EVA-17A on 2/22 (Thursday), after configuring the DC1 comm system for their presence. Activities by Tyurin and Lopez-Alegria today focused on

1. Suit fit adjustment for height on both Orlans (to be repeated as necessary during the dry-run and under reduced airlock pressure);
2. Leak checks and valve functionality tests on the suits, their BSS interface units and the hatch KVDs (pressure equalization valves, U.S.: PEVs) in the DC1 and Service Module Transfer Compartment (SM PkhO) from their EVA support panels (POV);
3. Leak checking on the oxygen repressurization tanks (BK-3, primary & backup);
4. Installing Orlan ORUs (on-orbit replaceable units) such as O<sub>2</sub> tanks, batteries, LiOH cans, moisture collectors & feedwater filters;
5. After setting up the Orlan "Tranzit" communications links via the suits' BRTA radio telemetry units, the crew, with the ground, performed voice, telemetry and biomedical parameter transmission tests, and functional testing of the Russian BETA-08 ECG (electrocardiogram) lead cable belts, worn under the Orlan-M suits, using the Gamma-1M medical complex from the PKO medical exam panel;
6. Installing the usual additional portable air repress bottle (BNP) in the "Pirs" module (to support a DC1 repress in the event of a failure of the DC1/PkhO hatch's pressure equalization valve), and a second BNP supplementary portable air repress bottle in the repress line of the SM's work compartment (RO).

In the Soyuz 13S spacecraft, docked at the FGB nadir port, the FE-1 configured its ASU toilet facility for potential activation and use by Sunita Williams during her EVA-17A lockout (SM-to-FGB hatch closed).

In the U.S. Airlock, FE-2 Williams set up the maintenance gear for the standard EMU (Extravehicular Mobility Unit) cooling loop “scrubbing”, then started the ionic and particulate filtration process of the water circuits of EMUs #3008 & #3018 for elimination of any biomaterial residues and solid particles.

As part of the standard pre-EVA fitness evaluation, Mike L-A undertook the Russian MO-5 MedOps protocol of cardiovascular evaluation during graded exercises on the VELO cycle ergometer, his second, assisted by Mikhail Tyurin, who had completed the test on 1/29, as CMO (Crew Medical Officer). *[The assessment, supported by ground specialist tagup (VHF) and telemetry monitoring, uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph cuff wired to the cycle ergometer's instrumentation panels. For the graded exercise, the subject works the pedals after a prescribed program at load settings of 125, 150, and 175 watts for three minutes each. Data output involves a kinetocardiogram, rheoplethysmogram, rheoencephalogram and a temporal pulsogram.]*

Williams collected the periodic cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Later, Sunita also completed the periodic atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit).

Batteries were to be replaced if necessary. *[CSA-CP measurements were gathered with the new 12A.1 units #1051 (prime) & #1044 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1003 for CO<sub>2</sub> in Service Module (SM) and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1051, and returned to their regular locations.]*

Tyurin downlinked data collected by the ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) experiment, via OCA (Orbit Communications Adapter) comm, after yesterday's change in the orientation of its AST spectrometer.

FE-2 Williams conducted the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Later, Sunita performed the regular bi-monthly reboot of the OCA Router and File Server SSC (Station Support Computer) laptops.

Lopez-Alegria and Williams completed another filling out of the regular weekly FFQ (Food Frequency Questionnaire) on the MEC (Medical Equipment Computer), his twentieth and Suni's ninth, which keeps a personalized log of their nutritional intake over time on special MEC (Medical Equipment Computer) software. *[The FFQ, updated with the new food brought up on 12A.1, records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. IBMP/Moscow (Institute of Biomedical Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value of the crew's food intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]*

L-A performed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The CDR also conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni transferred Misha's, L-A's and her own exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his voluntary "time permitting" task list, the FE-1 performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility)

in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

As a second “free time” task, the cosmonaut conducted the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload. *[Rasteniya researches growth and development of plants (currently barley and peas) under spaceflight conditions in the Lada-10 greenhouse.]*

At ~5:30am EST, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~11:05am, the crewmembers conducted their regular weekly tagup with the Lead Flight Director at JSC/MCC-H.

At ~11:55am, Mike L-A had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

This morning at ~8:50am, on DO16, TsUP/Moscow undertook the usual fuel (UDMH) transfer from Progress M-59/24P's BG1,2 propellant tankage to the SM's ODU (Integrated Propulsion System) BG1 tank.

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Acraman Impact Crater** (*Acraman impact crater in south central Australia is one of the oldest impact craters on Earth, dated at approximately 590 million years. The crater diameter is 90 km. Lake Acraman marks the approximate center of the crater and Lakes Gairdner and Everard mark the approximate boundaries. Since the ISS orbit clipped the edge of the crater, researchers wanted context views of Acraman. Because of normal ISS sleep time and sun angles they typically don't see Australia with such high sun angles. Center Point: 32.92S, 135.45E*), **North Mariana Islands, & Guam** (*this orbit pass just clipped the southern end of the box for this site. Context views of the island chain, especially the islands at the southern end, are highly desirable. Guam is the largest and southernmost island of the Marianas chain and is about 48 km in length [North to South] and ranges from 6 to 20 km in width. The other two large islands that the crew saw to the NE of Guam were Tinian and Saipan. Center Point – Guam: 13.47N, 144.79E; Center Point – Tinian: 14.97N, 145.62E; Center Point – Saipan: 15.2N, 145.75E*), **Hyderabad, India** (*although most cities in India were obscured by haze, the almost-nadir pass over the city should have allowed for good imagery of the target site. Hyderabad is*

*the capital city of the Indian state of Andhra Pradesh. The population of this city is approximately 8.1 million people and it is India's 5th largest metropolis. As one of the CEO project's "megacities" researchers want detailed documentation of the city itself as well as the boundaries and land use surrounding the city. Center Point: 17.23N, 78.29E), and **Somalia Coast** (ISS had a nice pass over the coast of Somalia and since it was almost a nadir pass, researchers requested a longer lens for detailed imagery of the coast dunes and blow outs along the coast. Center Point for this box site: 3.0N, 46.25E).*

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:20am EST [= epoch]*):

Mean altitude -- 335.1 km

Apogee height -- 349.1 km

Perigee height -- 321.0 km

Period -- 91.23 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020893

Solar Beta Angle -- 20.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 137 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47171

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

02/22/07 -- Russian EVA 17A (Progress antenna retraction, etc., 5:00am, 6 hrs)

03/02/07 -- ISS reboost (delta-V~2.1 m/s)

03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM), i.e., on CMGs;

03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)

03/17/07 -- STS-117/13A docking

03/24/07 -- STS-117/13A undocking

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
09/02/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/03/07 -- Progress M-61/26P launch  
09/05/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port)  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/15/07  
**Date:** Thursday, February 15, 2007 1:52:01 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/15/07**

All ISS systems continue to function nominally, except those noted previously or below.

On their current work/rest cycle, the crew woke up last night at 9:00pm and went to sleep today at 12:30pm EST.

Before breakfast, FE-2 Williams began Part 1 (of 5) of the periodic acoustic measurement protocol by deploying crew-worn acoustic dosimeters, to be carried for 24 hours (with a microphone on the shirt collar). (Last time done: 12/26/06). *[Today around noon, after about 15 hours of measurements, dosimeter data were recorded and the hardware power-cycled for another data take starting tonight after 8.5-hr. sleep. At that point, the crew will deploy the dosimeters statically in the station for the duration of the day, record measurements tomorrow noon and stow the instruments. Acoustic data must be taken twice per Increment, each time for the duration of the 16-hour crew workday.]*

In preparation for today's continued Orlan activities, Williams again set up the PD-100 video camera equipment for observing the activities from the DC1 (Docking Compartment) through the Lab via U.S. Ku-band. Later in the day, the video gear was disassembled (to keep hatchways and contingency translation path free of cables during crew sleep).

The FE-2 also worked in the Soyuz 13S spacecraft, configuring its ASU toilet facility for potential activation and use during her EVA-17A lockout (SM-to-FGB hatch closed). *[Preparations included unloading and transferring a newly arrived container from Progress M-59/24P.]*

In the DC1 "Pirs", Lopez-Alegria and Tyurin concentrated on preparations for the upcoming Orlan dry run on 2/20 (Tuesday) and the EVA-17A on 2/22 (Thursday), after configuring the DC1 comm system for their presence. *[Activities today*

*focused on Orlan interface unit (BSS) checkout in SM PkhO (Service Module Transfer Compartment) & DC1 (Docking Compartment), gear configuring, leak checking of BSS and umbilicals in PkhO & DC1, liquid/gas separation in Orlan & BSS cooling loops (“degassing”), removing the old lights from the Orlans (U.S. EHIP {EMU Helmet Interchangeable Portable} from suit #27, Russian light from #25) and installing newly delivered Russian lights on the Orlans (2 each – one left, one right), terminating 825M3 battery pack #2 charging and removal, setting up personal gear (KVO liquid cooling garment, ShL-10 comm cap, BK-10 thermal comfort undergarment, socks, diaper), installing U.S. add-on hardware on the Orlans, prepping NASA auxiliary equipment to be used in the Orlans, and installing suit cooling restraint straps on the Orlans. All activities were photo/video documented. More EVA-17A preparation activities are scheduled tomorrow, in particular Orlan ORU (on-orbit replaceable unit) installation, such as O<sub>2</sub> tanks, batteries, LiOH cans, moisture collectors & feedwater filters, Orlan suit resizing, etc.]*

Having completed her extensive preparatory work on U.S. EVA tools for Stage 13A ahead of time, Sunita Williams used a time slot reserved for that to work off the U.S. “job jar” task list, particularly an audit to assess available stowage space behind a panel (#405) in the FGB.

The FE-2 continued monitoring the performance of the running U.S. VOA (Volatile Organics Analyzer) by checking its screen several times during the day for status indication messages. *[As of now, the instrument is functioning nominally.]*

Williams also conducted the periodic sampling of cabin air for subsequent analysis on the ground. *[Sunita started out by checking for CO (carbon monoxide) in the SM (Service Module) with the IPD-CO Draeger tubes sampler, followed by using the Russian AK-1M adsorber to sample the air in the SM and FGB, and later collecting samples with the GSC (Grab Sample Container) at the center of the SM and Lab.]*

In addition, Suni retrieved and stowed the two FMKs (Formaldehyde Monitoring Kits) deployed by her on 2/13 in the Lab (below CEVIS cycle) and SM (most forward handrail).

Wearing protective gear, FE-1 Mikhail Tyurin performed routine service on the ASU toilet facility in the SM by replacing its pretreat container (E-K) plus hose with a new assembly and discarding the old one. *[E-K contains five liters of pre-treat solution, - a mix of H<sub>2</sub>SO<sub>4</sub> (sulfuric acid), CrO<sub>3</sub> (chromium oxide, for oxidation and purple color), and H<sub>2</sub>O (water). The pre-treat liquid is mixed with water in a dispenser (DKiV) and used for toilet flushing.]*

Mike L-A completed the weekly audit/inventory of the available CWCs (Contingency Water Containers) and their contents, which keeps a running account of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

Mikhail Tyurin supported the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) by changing the position of the ALS spectrometer, i.e., turning the instrument by 90 deg around its Z- and X-axes so that its windows now face starboard and port panels. The AST was then secured with Velcro and the new setup photographed with the Nikon D1X digital camera.

Turning to the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, the FE-1 used the Nikon-D1X to take the periodic photography of the setup, including the growth of the barley and pea seeds in the Lada-10 greenhouse. The images were then copied to the RSK1 laptop for subsequent downlink to TsUP-Moscow via BSR-TM or OCA.

Sunita Williams disconnected the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable at the Lab RWS (Robotics Work Station), used for video coverage of yesterday's successful translation of the MT (Mobile Transporter) carrying the SSRMS robotarm on the MBS (Mobile Base System) to Worksite 2 for 13A.

Lopez-Alegria and Williams conducted the MedOps WinSCAT (Spaceflight Cognitive Assessment Tool) experiment by logging in on the MEC (Medical Equipment Computer) and performing the psychological evaluation exercise on the laptop-based WinSCAT experiment (L-A's fourth {plus one repetition}, Suni's first). *[WinSCAT is a time-constrained questionnaire test of cognitive abilities, routinely performed by astronauts aboard the ISS every 30 days before or after the PHS (periodic health status) test or on special CDR's, crewmembers or flight surgeons request.]*

Later, Williams unstowed and set up the hardware for the urine collection part of her next session with the NUTRITION experiment. *[The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts, collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on*

*two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI/Minus Eighty Degree Celsius Laboratory Freezer for ISS), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

L-A completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The FE-2 conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni transferred Misha's, L-A's and her own exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his voluntary "time permitting" task list, the FE-1 performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

At ~9:10am EST, Houston flight controllers commanded a 15 mmHg N<sub>2</sub> (nitrogen) repress of the ISS cabin atmosphere to make up for total pressure loss during EVA-17A and prepare for 13A. *[Both Lab and Node PCAs (Pressure Control Assemblies) were used to reduce the duration of the repressurization to approximately 1 hr 40 min. For the duration of the repress, the Russian pressure control system was switched from Rapid Depressurization sensors (DDI) to Total Pressure sensors (MDD). Afterwards, pressure alarm settings were restored to*

*their nominal values ( $P_{min} = 690 \text{ mmHg}$ ,  $P_{max} = 790 \text{ mmHg}$ .)*

*Preview of EVA-17A (updated):* The Orlan spacewalk on 2/22 by Mikhail Tyurin (EV1) and Mike Lopez-Alegria (EV2) from the DC1 will take an estimated 6 hrs, starting with EV hatch opening at ~5:00am EST and ending nominally at 11:04am EST.

Main objectives:

- Taking photos of GTS (Global Timing System) antenna unit on SM small diameter (RO);
- Retracting/releasing Progress M-58/23P KURS 2AO-VKA orientation antenna at SM aft end port;
- Completing WAL2 antenna ops on SM (AFU/Antenna Feeder Unit for European ATV PCE/Proximity Communications Equipment);
- Photography of reflector surfaces on the MVM "Visiometer" internal & external VVT docking target for the ATV (three LSV-M Laser retro-reflectors #1, 2, 3, if lighting conditions permit);
- Inspection of ASN-M Satellite Navigation hardware along cable routing path, with photography; plus reconfiguring HF connectors on FP18 connector patch panel;
- Swapping SKK-5 material exposure container for SKK-9 at SM aft end, plus photography;
- Mating "VTN-Neutron" payload hardware connectors on SM;
- Taking photographs of handrail HR2421 in the SMDP (Service Module Debris Panel) #6 installation area;
- Taking photographs of the German ROKVISS experiment and TM/TC "monoblock" payload;
- Transferring & installing two "Yakor" foot restraints on DC1 EVA ladder; and
- Inspecting retention mechanisms & bolted joints on GStM-2 "Strela-2" cargo boom.

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Palmyra Atoll, Central Pacific** (*Palmyra Atoll is the northernmost permanent land of the Line Islands. It is comprised of a ring of inter connected island and islets that enclose a central lagoon. Documenting the reefs surrounding the island and any structures that the crew may have seen in the lagoon. Center Point: 5.52N, 162.06W*), **Kingman Reef, Hawaiian Island chain** (*Kingman reef is the northernmost of the Line Islands. It is located 53 km NW of Palmyra Atoll. In 2001 it was declared a National Wildlife Refuge by the U.S. Fish and Wildlife Service. The intent is to protect some of the most pristine coral reefs to be found in U.S. waters. Documenting the current state of the coral reefs. Center Point: 6.24N, 162.22 W*), **Porongurup National Park** (*Dynamic Event - Porongurup National*

*Park experienced a devastating brush fire on February 12. Despite its small size the park is home to ten species of plants found nowhere else in the world. Sterling National Park is visible as a green rectangular area to the north of the fire. Looking for smoldering fires and/or burn scars), **Mekong River Delta** (the Mekong delta is one of the highly dynamic deltas that are being documented. Trying for oblique views of the Mouths of the Mekong. Most likely, there were popcorn cumulus in the area. Center Point for target area: 10N, 105.5E), and **Addis Ababa, Ethiopia** (Addis Ababa is the capital city of Ethiopia and one of the "megacities" that are being documented. The population of the city is currently about 4 million; however, when surrounding areas are included the number increases to 7 million. The city lies at the base of Mount Entoto. Documenting the city boundaries as well as land use patterns surrounding the city. Center Point: 9.02N, 38.42E.)*

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:00am EST [= epoch]*):

Mean altitude -- 335.2 km

Apogee height -- 349.1 km

Perigee height -- 321.2 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020789

Solar Beta Angle -- 23.7 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 129 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47155

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

02/22/07 -- Russian EVA 17A (Progress antenna removal etc., 5:00am, 6 hrs)

03/02/07 -- ISS reboost (delta-V~2.1 m/s)

03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM), i.e., on CMGs;

03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)

03/17/07 -- STS-117/13A docking

03/24/07 -- STS-117/13A undocking

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
09/02/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/03/07 -- Progress M-61/26P launch  
09/05/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
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Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/14/07  
**Date:** Wednesday, February 14, 2007 11:50:29 AM  
**Attachments:**

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### **ISS On-Orbit Status 02/14/07**

All ISS systems continue to function nominally, except those noted previously or below. *Happy Valentine's Day!*

Daily crew work/rest cycle has shifted again, from wakeup at 9:40pm last night to sleep at 12:30pm EST today. *[Tonight: wakeup @ 9:00pm, sleep @ 12:30pm tomorrow.]*

In preparation for today's Orlan activities, FE-2 Williams set up the video camera equipment for observing the activities. Later in the day, the video gear was removed again.

Meanwhile, FE-1 Tyurin performed the periodic routine activation of the gas analyzer (GA) in the Soyuz TMA-9/13S spacecraft, docked at the FGB nadir port, via its InPU Integrated Control Panel.

In the DC1 (Docking Compartment), Lopez-Alegria and Tyurin focused on preparations for the upcoming Orlan dry run on 2/20 (Tuesday) and the EVA-17A on 2/22 (Thursday), after configuring the DC1 comm system for their presence.

The spacewalkers terminated the charging on the 825M3 Orlan battery pack #1 and started the process on pack #2, then checked out and readied the replaceable components (OTA) and auxiliary gear for their particular Orlan "skafandr" suits, including bundling the gear to be taken outside. *[Orlan #25 with BRTA-13 telemetry system will be worn by Mike L-A (EV2), #27 with BRTA-12 by Misha (EV1). OTAs and auxiliary gear include portable primary & reserve O<sub>2</sub> tanks (BK-3), storage batteries (825M3), LiOH canisters (PL-9), moisture collectors, liquid cooling garments (KVO), comm headsets (ShL-10), gloves (GP-10K), thermal comfort undergarments (BK-10), socks, diapers, filters for feedwater lines (FOR), Orlan CO<sub>2</sub> measurement units (IK), degassing pump unit (BOS), etc. More Orlan prep activities are scheduled tomorrow, in particular Orlan interface unit (BSS)*

*checkout in SM PkhO (Service Module Transfer Compartment) & DC1 (Docking Compartment), gear configuring, leak checking of BSS and hoses in PkhO & DC1, liquid/gas separation in Orlan & BSS cooling loops, installing Russian lights on the Orlan suits, terminating 825M3 battery pack #2 charging and removal, installing U. S. add-on hardware on the Orlans, prepping NASA auxiliary equipment to be used in the Orlans, and installing suit cooling restraint straps on the Orlans.]*

Afterwards, DC 1 communications configuration was restored to its previous condition.

Later in the day, Tyurin prepared the photo imagery from the Orlan and gear bundle preparations for downlinking to the ground via OCA, and Lopez-Alegria conducted a tagup with EVA specialists at MCC-H.

Sunita Williams again had several hours reserved for preparing and configuring the U.S. EVA tools required for Stage 13A. *[Her activities today centered on emptying all four Airlock C/L (Crew Lock) bags, repositioning unpacked tools needed by 13A and unstowing items required for 13A but not used during the recent three Stage EVAs.]*

Mikhail Tyurin performed the mandatory Russian 30-min. pre-EVA MedOps procedure MO-6 (hand muscle tonus assessment) in the SM, supported by tagup with ground specialists.

The FE-2 monitored the performance of the running U.S. VOA (Volatile Organics Analyzer) by checking its screen several times during the day for status indication messages.

Suni also conducted the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

The FE-1 conducted the periodic (monthly) functional closure test of a spare emergency vacuum valve (AVK) for the Vozdukh CO<sub>2</sub> removal system, in the spare parts kit. *[The AVKs are critical because they close the Vozdukh's vacuum access lines in the event of a malfunction in the regular vacuum valves (BVK) or a depressurization in the Vozdukh valve panel (BOA). Access to vacuum is required to vent carbon dioxide (CO<sub>2</sub>) during the regeneration of the absorbent cartridges (PP). During nominal operation, the AVK valves remain open.]*

After yesterday's successful ground-commanded setup of the SSRMS (Space Station Remote Manipulator System) from the previous EVA-6 viewing position for the MT (Mobile Transporter) translation, the ground today moved the MT with the MBS (Mobile Base System) and the SSRMS on top from WS-5 (Worksite 5) to WS-2. *[The MT had been left at WS-5 at the end of the 12A.1 mission. The MT translation is in preparation for assembly flight 13A, and a pre-launch checkout of the MSS (Mobile Service System) is scheduled for next Monday (2/19), with ISS crew participation. For the MT translation today, Russian thrusters were disabled from 10:00am to 11:30am EST.]*

Sunita completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni transferred Misha's, L-A's and her own exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from his discretionary "time permitting" task list, Misha Tyurin conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Also off the task list, the FE-1 performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

As a third "free time" task, the cosmonaut conducted the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload. *[Rasteniya researches growth and development of plants (currently barley and peas) under spaceflight conditions in the Lada-10 greenhouse.]*

For the voluntary "Saturday Science" program on 2/17, payload scientists have offered Suni the choice of one or both of two EPO (Education Payload Operations)

demos, dealing with (1) Onboard Fitness Training and (2) the exciting IPY (International Polar Year) project. The FE-2 will have until later today to decide.

*[IPY involves synchronized observations of PMCs (Polar Mesospheric Clouds), Aurorae, and other large-scale polar phenomena from the ISS and ground sites.*

*ISS crewmembers will make observations of bi-polar phenomena in concert with scientists at polar-based ground sites. Space-based observations, on the length scale of half a continent, will augment ground-based measurements. Background: For more than 40 years astronauts have been observing Earth, taking photographs or digital images from spacecraft. Today, a robust program of observation from the ISS has yielded hundreds of thousands of images of the Earth's surface collected since 2001. Because the ISS has an orbital inclination of 51.6 degrees, high latitude observations are common. Some of the most striking images collected include views of polar phenomena. Astronauts routinely pass above brilliant red and green aurora, view high, wispy clouds at the top of the atmosphere, or look down on glaciers and floating ice rafts. These images are easily interpreted by students and teachers. Astronaut observations provide a way to visualize complicated polar phenomena and communicate about them to students of all ages.*

*Over the next two years, station crews will formally focus their observations on polar phenomena as participants in the IPY (International Polar Year). Their imagery will be coordinated with other IPY scientists staging studies and field campaigns on the ground. The imagery will be cataloged and posted on NASA's web-based database of images, allowing investigators, students and teachers to search through the imagery, assemble image datasets, and download the imagery and the metadata.]*

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Canberra, Australia** (this was the first of two Australian cities the crew could see on this orbit. Their sleep shifting provides the opportunity to capture these cities with very high sun angles. Researchers are interested in land use and city and land use boundaries. Canberra has a population of over 328,000 and is Australia's largest inland city and is located 300 km SW of Sydney. Detailed mapping pass), **Sydney, Australia** (Sydney is the most populous city in Australia with a metropolitan area population of over 4.2 million people [2006 estimate]. As one of the cities that observers have highlighted for study, interest is in documenting urban growth and subsequent changes in the areas adjacent to the city. Detailed mapping pass), **Lake Eyre, Australia** (Lake Eyre is one of the world's largest internally draining systems. It is located 15 m below sea level and is the largest salt pan in the world. The Lake Eyre salt pan fills with water when the rivers of Queensland's channel country in the NE receive enough water to flow through the channels on the edge of the Simpson Desert. Some believe that the water levels in Lake Eyre fluctuate with El Niño cycles although this connection has not been proven. With the crew's oblique perspective, they were to try to get most or all

of Lake Eyre in a single image), and **Somalia Coast** (researchers have time series documentation of this area showing the coast during pre- and post-El Niño cycles. The crew was to document the vegetation and dunes along the coast. Typically, in an El Niño year this region experiences heaving rainfall causing the coastal vegetation to turn a vivid green. The dunes and blow-outs along the coast offer a striking contrast to the local vegetation).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 6:40am EST [= epoch]):

Mean altitude -- 335.3 km

Apogee height -- 349.4 km

Perigee height -- 321.2 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0020989

Solar Beta Angle -- 26.9 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47139

**Significant Events Ahead** (all dates Eastern and subject to change [changes are called out]):

02/22/07 -- Russian EVA 17A (Progress antenna removal etc., 5:00am, 6 hrs)

03/02/07 -- ISS reboost (delta-V~2.1 m/s)

03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM)

03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)

03/17/07 -- STS-117/13A docking

03/24/07 -- STS-117/13A undocking

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
09/02/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/03/07 -- Progress M-61/26P launch  
09/05/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
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Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](mailto:jvonputt@hq.nasa.gov);  
**CC:**  
**Subject:** ISS On-Orbit Status 02/13/07  
**Date:** Tuesday, February 13, 2007 1:24:43 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/13/07**

All ISS systems continue to function nominally, except those noted previously or below.

Daily crew work/rest cycle has shifted again, from wakeup at 9:00pm last night to sleep at 1:10pm EST today. *[Tonight: wakeup @ 9:40pm, sleep @ 12:30pm tomorrow.]*

FE-1 Mikhail Tyurin serviced the Russian BMP Harmful Impurities Removal System, starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The bake-out will be terminated later today before sleep time (~11:25pm EST). *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

The crew continued preparations for the Russian Orlan EVA-17A next week. The CDR and FE-1 reviewed the updated timeline plus EVA tool procedures for the spacewalk and subsequently tagged up with ground specialists to discuss details, while the FE-2 set up the battery- or RS-powered Sony PD-100 camcorder. *[The spacewalk on 2/22 by Mikhail Tyurin (EV1) and Mike Lopez-Alegria (EV2) from the DC1 Docking Compartment will take an estimated 6 hrs, starting around 5:00am EST. Main objectives: (1) Retraction of Progress M-58/23P KURS 2AO-VKA orientation antenna at SM aft end port; (2) Completion of WAL2 antenna ops on SM (AFU/Antenna Feeder Unit for European ATV PCE/Proximity Communications Equipment); (3) Photography of the optical surfaces on the MVM "Visiometer" internal & external docking target for the ATV (three LSV-M Laser retro-reflectors #1, 2, 3, if lighting conditions permit); also of the German ROKVISS experiment and other subjects; (4) Inspection of ASN-M Satellite Navigation hardware along cable routing path, with photography; (5) SKK-5*

*exposure container swap with SKK-9 at SM aft end, plus photography; (6) Mating “VTN-Neutron” hardware connectors on SM; (7) Inspection of retention mechanisms & bolted joints on GStM-2 “Strela-2” cargo boom; and (8) Transfer & installation of two “Yakor” foot restraints on DC1 EVA ladder.]*

Sunita Williams had several hours reserved for preparing and configuring the U.S. EVA tools required for Stage 13A. *[The activities centered on emptying all four Airlock C/L (Crew Lock) bags, repositioning tools needed by 13A and stowing all tools used during the recent three spacewalks that will not be required for 13A.]*

Tyurin prepared the Materials Exposure Experiment #9 (SKK-9) for EVA-17A, supported by ground specialist tagup via S-band/audio.

Later, the FE-1 set up the first 825M3 battery pack for the Orlan spacesuits and initiated the charging process.

Misha (EV1) and Mike L-A (EV2) performed the mandatory Russian pre-EVA MedOps procedure MO-6 (hand-cycle ergometry) in the Service Module (SM), assisting each other in turn and supported by tagup with ground specialists who are to clear them for spacewalking. *[Because cosmonauts in early Russian programs have shown noticeable decrease in arm muscle tone, TsUP/IBMP (MCC-Moscow/ Institute of Biomedical Problems) physical fitness experts have groundruled the handgrip/arm tolerance test analysis (hand ergometry) as a standard pre-Orlan EVA requirement. For MO-6, the subject dons the ECG (electrocardiogram) biomed harness, attaches three skin electrodes and plugs the harness into the PKO medical exam panel on the cycle ergometer. The other crewmember assists. The 30-min exercise itself starts after 10 seconds of complete rest, by manually rotating the cycle's pedals, set at 150 W, backwards until "complete exhaustion".]*

To provide video support to today's and tomorrow's ground-commanded SSRMS (Space Station Remote Manipulator System) and MT (Mobile Transporter) operations, L-A hooked up the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable at the RWS (Robotics Work Station). *[Purpose of SSRMS ops today is to configure the robot arm from EVA-6 viewing position into a suitable position for the MT translation from WS-5 (Worksite 5) to WS-2. The latter is scheduled for tomorrow, also by remote commanding from MCC-H.]*

Williams undertook the periodic deployment of two passive FMK (formaldehyde monitoring kit) sampling assemblies in the Lab (below CEVIS) and SM (most forward handrail), to catch any atmospheric formaldehyde on a collector substrate for subsequent analysis on the ground.

Tyurin completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The CDR conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

FE-2 Williams performed the standard weekly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), to check the condition of the roller bearings and record its time & date values.

Suni also did the regularly scheduled inspection of the RED (Resistive Exercise Device) machine, inspecting the condition of the canister cords (every two weeks).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni transferred Misha's, L-A's and her own exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his voluntary "time permitting" task list, the FE-1 performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also from the task list, the FE-1 conducted the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, checking on humidity level and recharging the water tank as necessary. *[Rasteniya researches growth and development of plants (currently barley and peas) under spaceflight conditions in the Lada-10 greenhouse.]*

At ~8:55am EST, Misha Tyurin downlinked two messages of greetings to TsUP/ Moscow, one for the staff and veterans of the Russian Federation Ministry of Interior's Department of Security for their 60<sup>th</sup> Anniversary on 2/17 ("*... On this day of celebration, we would like to express our deep gratitude to you for your selfless*

*service to enforce law and order on the sites of Star City, Baikonur, Plesetsk, Svobodny and at other secure space facilities....”), the other for the veterans of World War 2 (the Great Patriotic War) who will meet on 2/19 on the occasion of Defender of the Motherland Day on 2/23 (“...Flying over the Earth we can see the beauty and vulnerability of our planet. We hope that people of Russia and the United States who held victory over fascism in long-ago 1945 will preserve and pass on to the young generation the spirit of the link-up at the river Elbe in order to maintain and strengthen peace in the world and to make life flourish on Earth....”).*

Early yesterday morning, starting at 1:00am EST and running for seven hours, MCC-Houston and its Moscow support group (HSG) conducted another BCC (Backup Control Center) dry run in test mode, with no involvement of the ISS crew or vehicle. The actual BCC Checkout is scheduled for 2/15. *[Purpose of this periodic exercise is to demonstrate BCC functionality under Russian assets while providing proficiency training for HSG personnel at the HSR (Houston Support Room) and TsUP-Moscow specialists. The ISS EMCC (Emergency Mission Control Center), located in Russia, comprises TsUP/Moscow as the Lead Control Center, coupled with HSR at TsUP. The BCC facility provides a command and control capability from TsUP if the EMCC must be activated. This is the case in situations that render MCC-Houston unable to provide telemetry, voice, and command capability for extended periods. EMCC is also used when the threat of severe weather results in evacuation of the MCC-H building for extended periods. In such an emergency, both Russian servers (CMD/command & TM/telemetry) are transitioned from MCC-H connectivity to BCC configuration, after which only the BCC can connect to the CMD and TM ports. An actual contingency requiring switchover to the BCC occurred on 10/2/2002 when Hurricane Lili forced MCC-H to shut down at 4:00am EDT, and also in 2005 during the Hurricane Katrina emergency.]*

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **S. Mozambique** (although this area has been under cloud cover lately, clearing from the SW should have allowed for photography by the time of ISS overflight. Researchers are keenly interested in the land use in Southern Mozambique because of changes that will occur fairly quickly. The discovery of gas fields will create infrastructure in this relatively undeveloped area; mapping passes), and **Patagonian Glaciers** (this was the most southern of ISS orbits over the Patagonian ice fields for this day. As could be expected, the weather was not totally clear. The second Patagonian pass was slightly more north of the area passed over earlier in the day. Concentrating on the smaller glaciers).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are

downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:20am EST [= epoch]*):

Mean altitude -- 335.4 km  
Apogee height -- 349.5 km  
Perigee height -- 321.3 km  
Period -- 91.24 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0021006  
Solar Beta Angle -- 29.8 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 109 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47123

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

02/22/07 -- Russian EVA 17A (Progress antenna removal etc., 5:00am, 6 hrs)  
03/02/07 -- ISS reboost (delta-V~2.1 m/s)  
03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM)  
03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)  
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03/24/07 -- STS-117/13A undocking  
04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12) **[date changed]**  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S docking (SM aft port) **[date changed]**  
04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) **[date changed]**  
05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
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Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/12/07  
**Date:** Monday, February 12, 2007 1:01:46 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/12/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 21 of Increment 14. Congratulations to the crew for their highly expert systems recovery!*

Daily crew work/rest cycle has shifted again, from wakeup at 9:00pm last night to sleep at 12:30pm EST today. *[Tomorrow: Wake @ 9:00pm tonight, sleep @ 1:10pm.]*

**Update on 2A POR:** After yesterday's power loss on the 2A solar array channel due to a DCSU POR (Direct Current Switching Unit/Power-On Reset), which caused all fuse-type RBI (Remote Bus Isolator) switches in the 2A DCSU to open, most of the 2A power configuration has been restored, and crew activities are back on schedule. As it turned out, most of the initial recovery steps, such as S-band string swap, MBSU (Main Bus Switching Unit) loss recovery procedures, etc., were taken by the crew because of the S-band string-2/comm loss to the ground. *[At the conclusion of the powerups and reactivations on 2A, the established configuration will have the 2B and 4A channels supporting most ISS core loads separate from 2A, providing full redundancy for most core systems. Core systems on 2A (including CMG-2, Russian SNTs 23 & 24, S-band String-2 and Ku-band) have been activated and brought online to provide additional redundancy. CMG-2 is back in the steering law. As long as the root cause of the 2A POR remains mysterious and is not understood, Channel 2A is considered suspect. In the current configuration, in the event of another failure only redundant systems are lost.]*

FE-1 Tyurin and CDR Lopez-Alegria began with preparations for the Russian Orlan EVA-17A next week by relocating a host of stowage items from the DC1 Docking Compartment and SM PkhO (Service Module Transfer Compartment) to other areas of the SM and the FGB, going by an uplinked listing of equipment/gear and destinations, while concurrently updating the IMS (Inventory Management System) database.

Mikhail Tyurin also serviced the Russian BMP Harmful Impurities Removal System, starting the "bake-out" cycle to vacuum on absorbent bed #1 of the regenerable dual-channel filtration system. Before sleep time today the bake-out will be terminated (~11:30am EST). Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

FE-2 Williams worked on the ER1 (EXPRESS Rack 1), connecting its MTL (Moderate Temperature Loop) jumper QDs (quick disconnects) to the nearby LAB1O2 UIP (Utility Interface Panel, "Z-panel").

Afterwards, Sunita performed post-EVA deconfiguring activities in the U.S. Airlock, stowing the two LCVGs (Liquid Cooling & Ventilation Garments) and restowing other items, but leaving the EMU bag deployed.

Later, at ~9:10am EST, Mike L-A and Suni tagged up with ground specialists to deliver their detailed EVA report, using an uplinked list of Debrief Questions. *["What were your top 3 biggest surprises during the EVAs?"; "How was your overall suit fit?"; "For future crew FQD (Fluid Quick Disconnect) training, what can they do to better prepare for FQD ops?"; "What surprised you about FQD ops?"; Please describe what the ammonia looked like that you saw on EVA-6, that came from the P6 male when you removed the stubborn cap."; "Any tips on jettison for future crews and trainers?", etc.]*

Williams completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The FE-2 also conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Later, Sunita did the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

At ~4:00am, Suni set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, power supply) and at 4:05am conducted a ham session with students of Hanazono Elementary School in Akashi-

city, Hyogo Prefecture, Japan. *[The school is located in Akashi, the city that Japan Standard Time is defined by. Students from the school are breeding the Japanese killifish that flew on the Space Shuttle with Japanese Astronaut Chiaki Mukai. "Do you sometimes have arguments with other astronauts?"; "What is beautiful in space?"; "Have you ever seen an UFO?"; "Where do you throw away trash and etcetera?"]*

At ~11:30am EST, the CDR conducted a personal all-hands S-band/audio telecon with MCC-Houston.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni transferred Misha's, L-A's and her own exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his voluntary "time permitting" task list, the FE-1 performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also from the task list, the FE-1 conducted the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, checking on humidity level and recharging the water tank as necessary. *[Rasteniya researches growth and development of plants (currently barley and peas) under spaceflight conditions in the Lada-10 greenhouse.]*

*Ahead this week:* Cabin atmosphere repress with about 10-15 mmHg N<sub>2</sub> (nitrogen) to make up for the drop in total pressure due to the EVAs.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:33am EST [= epoch]*):

Mean altitude -- 335.5 km

Apogee height -- 349.8 km

Perigee height -- 321.2 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0021284

Solar Beta Angle -- 32.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 88 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47108

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

02/22/07 -- Russian EVA 17A (Progress antenna removal etc., 5:00am, 6 hrs)

03/02/07 -- ISS reboost (delta-V~2.1 m/s)

03/03/07 -- Attitude +XVV to -XVV (180 deg), zero prop maneuver (ZPM)

03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)

03/17/07 -- STS-117/13A docking

03/24/07 -- STS-117/13A undocking

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

09/02/07 -- Progress M-60/25P undocking (DC1) & reentry

09/03/07 -- Progress M-61/26P launch

09/05/07 -- Progress M-61/26P docking (DC1)

09/07/07 -- STS-120/10A -- Node 2

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

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01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 02/11/07  
**Date:** Sunday, February 11, 2007 6:13:36 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/11/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday; ahead: Week 21 of Increment 14.*

Daily crew work/rest cycle has shifted to 11:00pm - 12:30pm EST.

The crew's normal Sunday routine was disrupted around 9:00am by sudden loss of the 2A Solar Array power channel when the channel's DCSU (Direct Current Switching Unit) failed. The opened RBIs (Remote Bus Isolators) in the electronics box, located on the IEU (Integrated Electronics Unit) of the P4 truss, cut off power to the MBSU (Main Bus Switching Unit) and DDCU (DC-to-DC Converter Unit) boxes downstream from the DCSU.

The crew, whose life was never in any danger, quickly responded as trained, restoring communications, switching to other systems, beginning to close the RBIs one by one to regain battery power control, followed by moving on to lower-level buses. Electric heaters were regained before any thermal constraints were violated.

Although CMG-2 (Control Moment Gyroscope 2) also lost power and is currently still spinning down, control of station attitude was not lost. The station is under Momentum Management mode by two CMGs (since CMG-3 was already out of the control loop). Momentum remained stabilized at ~50-55% capability.

Systems and subsystems are being switched back on one by one in a prescribed order, including repowering MBSUs 2A, 3A and 3B, requiring configuration settings being adjusted concurrently. This is involving considerable planning and commanding by the ground and will take time.

Most of the normally light Sunday schedule for the crew was changed to handle the anomalous situation. Among else, the regeneration of METOX (metal oxide)

canisters in the Airlock planned for today could not be completed. Four METOX canisters remain available for EVA.

No CEO (Crew Earth Observation) photo targets uplinked for today.

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Solar Beta Angle -- 34.1 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 107 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47092

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08/02/07 -- PMA-3 relocation  
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09/03/07 -- Progress M-61/26P launch  
09/05/07 -- Progress M-61/26P docking (DC1)  
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10/02/07 -- Soyuz TMA-11/15S launch  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/10/07  
**Date:** Saturday, February 10, 2007 3:00:55 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/10/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams, except for regular maintenance and voluntary work.*

Onboard work/rest cycle has now shifted to 1:00am EST wakeup, with sleep time today at an early 2:30pm and more shifting ahead to accommodate the Russian EVA-17A on 2/22 (i.e., wakeup tonight 11:00pm, sleep period tomorrow: 1:30pm – 9:00pm). By Monday morning the new wakeup time will be 9:00pm EST.

The crew conducted the regular weekly three-hour task of thorough station cleaning. [*"Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE-1's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.*]

As part of the house cleaning, FE-1 Tyurin performed preventive maintenance cleaning on the FGB ventilation system fans.

CDR Lopez-Alegria completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

At ~8:50am EST, the crew had their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

In the "Quest" Airlock (A/L), FE-2 Williams terminated the discharge process on the first set of EVA batteries in the BSA (Battery Stowage Assembly), then started it on the second set. *[Recharge will be performed later, closer to the next EMU EVA.]*

Also in the A/L, Sunita initiated METOX (metal oxide) canister regeneration. In support of this process, the CDRA (Carbon Dioxide Removal Assembly) was successfully activated yesterday after the software patch upload and is now running nominally. *[The intermittent CDRA shutdown was caused by a checksum error due to the new LAB3 MDM (Multiplexer/Demultiplexer) computer software, v. R3. A software patch to repair the problem was developed this week and uplinked to the LA3 MDM yesterday.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni transferred Misha's, L-A's and her own exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his voluntary "time permitting" task list, the FE-1 performed a session of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with the SIGMA 300-800 focal length lens to take pictures of the Southern Hemisphere glaciers to record boundaries of glacier tongues. *[Specific target areas were Patagonian Glaciers in nadir and South New Zealand Glaciers at right of track.]*

A second voluntary task for Misha today was the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

Also from the task list, the FE-1 conducted the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, checking on humidity level and recharging the water tank as necessary. *[Rasteniya researches growth and development of plants (currently barley and peas) under spaceflight conditions in the Lada-10 greenhouse.]*

Two new additions to the U.S. "job jar" task list are (a) to reconfigure all SSC

(Station Support Computer) laptops with new IP Phone ID settings, and (b) to clean the fan vents on an A31p laptop which was formerly used as a File Server until it developed a noise.

*EVA-17A Look-Ahead:* According to current preliminary planning, the Russian Orlan spacewalk on 2/22 by Mikhail Tyurin (EV1) and Mike Lopez-Alegria (EV2) from the DC1 Docking Compartment will take an estimated 6 hrs, starting around 3:30pm EST. Main objectives: (1) Retraction of Progress M-58/23P KURS 2AO-VKA orientation antenna at SM aft end port; (2) Completion of WAL2 antenna ops on SM (AFU/Antenna Feeder Unit for European ATV PCE/Proximity Communications Equipment); (3) Photography of the optical surfaces on the MVM "Visiometer" internal & external docking target for the ATV (three LSV-M Laser retro-reflectors #1, 2, 3, if lighting conditions permit); (4) Inspection of ASN-M Satellite Navigation hardware along cable routing path; (5) SKK #5 exposure container swap with SKK #9 at SM aft end; (6) VTN-Neutron hardware hookup on SM; (7) Inspection of mechanical and bolt fasteners on GStM-2 "Strela-2" cargo boom; and (8) Retrieval & installation of two foot restraints on DC1 ladder.

### **Weekly Science Update** (*Expedition Fourteen -- 20<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* On 1/31, ALTEINO memory card has been exchanged. File sizes are reported nominal. The crew was requested to remove the blue pouches (shielding tile kits) from ALTEINO field of view. Next activity is planned on 2/13 when crew will re-orient the spectrometer, correct the reference dosimeters set-up and make photos

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BASE:* Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA):* Complete.

*CBOSS (Cellular Biotechnology Support Systems):* Complete.

*CFE (Capillary Flow Experiment):* Complete.

*CSI-1/CGBA (CGBA Science Insert #1/Commercial Generic Bioprocessing Apparatus):* Two student experiments. The GHab (Garden Habitat) containing the seed germination experiment will be activated from the ground on 2/16. Up to 2000 third-grade students across the US will simultaneously be growing seeds in their

classrooms and measuring and observing the difference in growth rates and patterns between flight and earth grown seeds.

*CULT (Cultural Factors Questionnaire):* Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test):* Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* In progress.

*EPO (Educational Payload Operation):* Complete.

*ETD (Eye Tracking Device):* Complete.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology):* Planned

*GRAVI (Threshold Acceleration for Gravisensing):* Complete.

*IMMUNO (Saliva Sampling):* Complete.

*LEUKIN:* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs". Removal of passive dosimeters from the MATRYOSHKA Phantom was performed on 12/07 and returned on STS-12A.1.

*NOA (Nitric Oxide Analyzer):* Complete.

*Nutrition:* Planned.

*PK-3 (Plasma Crystal 3):* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* Planned.

*POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G):* Complete.

*RC (Refrigerated Centrifuge):* Planned.

*RS (Renal Stone):* Planned.

*SAMPLE*: Complete.

*SEM (Space Experiment Module)*: Complete.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight)*: Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite)*:  
In progress.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft)*: Planned.

*TRAC (Test of Reaction & Adaptation Capabilities)*: Planned.

*TROPI (Study of Novel Sensory Mechanism in Root Phototropism)*: Complete.

*YING (Yeast in No Gravity)*: Complete.

*CEO (Crew Earth Observations)*: Through 1/29 the ground has received a total of 3,872 of ISS/CEO images for review and cataloging. Sessions containing the target areas of the Ganges River Delta, the Toshka Lakes, the Somalia Coast, and Jarvis Island have been identified and are now under evaluation for target requirements.

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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 02/09/07  
**Date:** Friday, February 09, 2007 2:11:11 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/09/07**

All ISS systems continue to function nominally, except those noted previously or below.

Crew wakeup remained delayed at 3:30am EST this morning, but tonight ISS work/rest cycle returns to the earlier 4:30pm sleeptime and resumes the standard 1:00am–4:30pm rhythm tomorrow. *[And by the way, looking ahead: Beginning this year, Daylight Saving Time (DST) will start on March 11 instead of April 1.]*

Before breakfast & first exercise, Mike Lopez-Alegria and Sunita Williams completed another post-EVA session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

As standard post-EVA health status checkup, Lopez-Alegria and Williams also took the general U.S. PFE (Periodic Fitness Evaluation), a 20-min procedure to check up on general crewmember health after the record-breaking three spacewalks in the last nine days. Cardiovascular readings were logged on the MEC's IFEP software. Later, L-A and Suni also linked up with the ground via Ku- and S-band with NetMeeting/video for the usual private post-EVA medical conference (PMC). *[Note: During his ninth spacewalk yesterday, Mike L-A set a record for cumulative spacewalk time by a U.S. astronaut of 61 hrs 22 min, previously held by Jerry Ross with 58 hrs 32 min, also with nine EVAs. Suni gained the all-time women's record with EVA-8, having accumulated 29 hrs 17 min in four spacewalks during Increment*

*14. EVA-6,-7,-8 from the U.S Airlock and the upcoming Russian EVA-17A on 2/22 are the most ever done by station crewmembers during such a short period. All in all, a spacewalker needs about 100 hrs to prepare for an EVA. By doing the last three spacewalks within the short span of nine days, considerable crew time could be saved by avoiding repetition of some of the preps.]*

Post-EVA activities included FE-2 Williams working in the Airlock (A/L), first tearing down the SSC (Station Support Computer) laptop set up for the 10.2-psi Campout Prebreathe, then powering down the PCS (Portable Computer System) A31p laptop and transferring the spare laptop, used as backup, to the computer “pantry” for stowage.

The two spacewalkers also refilled the EMU (Extravehicular Mobility Unit) water tanks and initiated the recharge of the depleted EVA batteries in the BSA (Battery Stowage Assembly).

With the EVAs behind, FE-1 Tyurin worked on reactivating the Elektron-VM oxygen generator, with the usual preceding nitrogen (N<sub>2</sub>) purge of the BZh-9 Liquid Unit and ground specialist tagup.

Tyurin also collected the periodic cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Later, the CDR completed the periodic atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[CSA-CP measurements were gathered with the new 12A.1 units #1051 (prime) & #1044 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1003 for CO<sub>2</sub> in Service Module (SM) and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1051, and returned to their regular locations.]*

L-A and Suni completed another filling out of the regular weekly FFQ (Food Frequency Questionnaire) on the MEC (Medical Equipment Computer), his nineteenth and Suni’s eighth, which keeps a personalized log of their nutritional

intake over time on special MEC software. *[The FFQ, updated with the new food brought up on 12A.1, records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. IBMP/Moscow (Institute of Biomedical Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value of the crew's food intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]*

Looking ahead to the Russian EVA-17A on 2/22, the FE-1 worked an hour in the DC1 (Docking Compartment) and SM PkhO (Transfer Compartment) testing the EVA support panels (POV) which will be used for leak checks and valve tests on the Orlan suits, their BSS interface units and the hatch KVDs (pressure equalization valves, U.S.: PEVs).

Tyurin conducted the periodic checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1. He also installed an additional IP-1 at the DC1-to-Progress 24 docking unit (SU) hatch. TsUP-Moscow afterwards (~2:05pm EST) used the Regul command radio system to reconfigure the onboard IP-1 control algorithm accordingly.

After deactivation of the CO (carbon monoxide) gas analyzer (GL2106) in the SM by the ground via S-band, the FE-1 replaced its fan unit with a new spare. GL2106 reactivation was then performed by Tyurin.

L-A did the regular bi-monthly reboot of the OCA (Orbit Communications Adapter) Comm Router laptop.

In preparation for the scheduled LAB3 MDM (Multiplexer/Demultiplexer) computer transition plus upload of the new CDRA (Carbon Dioxide Removal Assembly) software patch (~2:13pm-3:43pm), L-A deactivated CHeCS (Crew Health Care Systems) hardware. *[The LSYS3\_R3 patch was developed to fix the logic glitch that caused the recent transient failures of the CDRA, allowing only intermittent operation in support of Metox (metal oxide) canister regeneration. Today, the EEPROM (Electrically Erasable Programmable Read-Only Memory)-only patch required the MDM to be transitioned to Diagnostics and then reinitialized from EEPROM.]*

For the subsequent CDRA activation, the CDR set up the required cooling by connecting the ITCS LTL (Internal Thermal Control System/Low Temperature Loop) via jumper to the LAB1D6 rack.

Sunita Williams took care of the routine inspection of the running ALTEA

(Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Williams also conducted the periodic (once per month) routine inspection of the RED (Resistive Exercise Device) with canister cords, squat harness components, and accessory straps, and the canister bolts for re-tightening if required.

Mike L-A completed the weekly audit/inventory of the available CWCs (Contingency Water Containers) and their contents, which keeps a running account of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

Mikhail Tyurin performed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The CDR conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni transferred Misha's, L-A's and her own exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from the discretionary Russian "job jar" list, Misha performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A second voluntary task remaining open on the Russian crew-choice list was to search for and audit available CO<sub>2</sub> filters. *[Nine filters were delivered on 6/24/06]*

*by Progress M-57 but never used. Besides, there is a great number of used filters on the ISS (about 15 items), which are stowed both as loose items and in bags. It is impossible to distinguish visually used filters from the new.]*

Also from the task list, the FE-1 conducted the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley and pea seeds in the Lada-10 greenhouse.

*EVA Statistics Update:* In tallying up EVA-6, -7 & -8 for this daily report in the last few days, several previous spacewalks were inadvertently skipped. The correct numbers (as of today): EVA-8 was the 80<sup>th</sup> spacewalk for ISS assembly & maintenance, the 52<sup>nd</sup> from the station (vs. Shuttle-based) with a total of 304 hrs 25 min, and the 32<sup>nd</sup> from the "Quest" Airlock. As of now, 59 NASA astronauts, 14 Russians and eight crewmembers representing Sweden (3), Japan (1), Canada (2), France (1) and Germany (1) have logged 491 hrs 45 min outside the station on building, outfitting and servicing it. *[Compare also our website at [http://www.hq.nasa.gov/osf/EVA/EVA\\_totals\\_table.html](http://www.hq.nasa.gov/osf/EVA/EVA_totals_table.html).]*

*Regul Update:* Troubleshooting of the 2<sup>nd</sup> string of the Russian Regul radio control & communications system (RSUS) has confirmed that the telemetry downlink function on set 2 is inoperable (not the first set, as reported yesterday). If two Molniya comsats are available, one can support BITS onboard measurement telemetry downlink and the other Regul commanding (uplink). TsUP also plans to perform testing on the more data-rate limited third set of Regul. *[Regul is the nominal uplink path for all Russian commands and is the only subsystem that operates using the KRL (Command Radio Uplink) which operates at a low data rate and is equivalent to the U.S. S-band system.]*

Today's CEO (Crew Earth Observation) photo target in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, was **Patagonian Glaciers** *(crew was asked to concentrate on the smaller glaciers on the north and east sides of the Northern Patagonian Ice Field. Clouds in the area made this target marginal. However there may have been cloud holes or gaps that could have enabled the crew to see and document the smaller glaciers. The center point for this target box was 49.0S, 73.5W).*

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 8:07am EST [= epoch]):*

Mean altitude -- 335.9 km

Apogee height -- 350.3 km

Perigee height -- 321.4 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0021525

Solar Beta Angle -- 36.3 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 50 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 47061

**Significant Events Ahead** *(all dates Eastern and subject to change [changes are called out]):*

02/22/07 -- Russian EVA 17A (Progress antenna removal etc., 3:30am, 6h)

03/02/07 -- ISS reboost (delta-V~2.1 m/s)

03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)

03/17/07 -- STS-117/13A docking

03/24/07 -- STS-117/13A undocking

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

07/24/07 -- US EVA-9

08/02/07 -- PMA-3 relocation

09/02/07 -- Progress M-60/25P undocking (DC1) & reentry

09/03/07 -- Progress M-61/26P launch

09/05/07 -- Progress M-61/26P docking (DC1)

09/07/07 -- STS-120/10A -- Node 2

10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port)

Late Oct/early Nov -- US EVA-10,-11,-12

11/??/07 -- Progress M-62/27P launch

01/29/08 -- Progress M-63/28P launch



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/08/07  
**Date:** Thursday, February 08, 2007 4:49:23 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/08/07**

All ISS systems continue to function nominally, except those noted previously or below.

Crew work/rest cycle remains shifted at 3:30am–7:00pm EST (upcoming adjustment is not yet resolved).

CDR Lopez-Alegria (EV1) and FE-2 Williams (EV2) **successfully completed EVA-8** with A/L (Airlock) hatch closure at 3:06pm EST, followed by cleanup and post-EVA ops.

Accomplished tasks of this spacewalk were –

- Remove and jettison a set of two P3 RJMC (Rotary Joint Motor Controller) avionics shrouds (Face 2/Zenith & Face 6/Nadir);
- Remove and jettison a set of two XPOP (X-axis perpendicular to orbit plane) avionics shrouds (Bay 20 & Bay 18);
- Deploy UCCAS (Unpressurized Cargo Carriers Attachment System) for 13A.1 cargo stowage on P3/Zenith (thrusters temporarily inhibited during deploy to observe load constraints);
- Remove two sets of P5-P6 RTAS (Rockwell Truss Attach System) launch locks (first 2 sets were removed during 12A.1; this is in preparation for Mission 10A);
- Outboard CETA (Crew & Equipment Translation Aid) “cleanup” (translation with EVA tools to the P3 worksite);
- Complete SSPTS (Station-to-Shuttle Power Transfer System) cable connections;
- Reinstall APFR (Articulated Portable Foot Restraint) retrieved during EVA-7 from from PMA-1 (Pressurized Mating Adapter 1);
- Cleanup & Ingress.

Get-ahead task completed: Photography of the PMA-2 ODS (Orbiter Docking System) connector.

*[Official start time of the spacewalk was 8:26am EST, 34 minutes ahead of schedule. Total EVA duration (PET = Phase Elapsed Time) was 6 hrs 40 min. It was the 75<sup>th</sup> spacewalk for ISS assembly & maintenance, the 47<sup>th</sup> from the station (vs. Shuttle-based) with a total of 273 hrs 2 min, and the 28<sup>th</sup> from the “Quest” Airlock. After today's spacewalk, 53 NASA astronauts, 13 Russians and five astronauts representing Japan (1), Canada (2), France (1) and Germany (1) have logged 460 hrs 22 min outside the station on building, outfitting and servicing it.]*

Before spacewalk begin, at ~4:00am EST Crewlock hatch was cracked for a hygiene break/with mask prebreathe for Lopez-Alegria and Williams, after spending the night on 10.2 psi campout. Shortly after 5:00am, the hatch was closed again for a continued depress period at 10.2, for a total time for EVA preps + EMU purge + prebreathe + depress below 10.2psi of ~3h 35 min.

FE-1 Tyurin, who provided IVA (intravehicular activities) support, used a DCS 760 EVA camera for documenting the hatch closure.

Earlier, Tyurin had set up the final configuration of the STTS onboard audio subsystem to support the EVA. After the spacewalk, the comm system was reset to the original conditions.

During the spacewalk, Mikhail completed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown.]*

The cosmonaut also completed the daily routine maintenance of the SOZh environment control & life support system in the SM, including ASU toilet facilities systems/replaceables.

Concluding the Russian/German TEKh-20 Plasma Crystal-3+ (PK-3+) experiment, Tyurin disconnected all payload cables but did not dismantle the hardware, leaving it instead on SM panel 227 for future use. *[The mostly automated experiment is performed on plasma, i.e., fine particles charged and excited by HF (high frequency) radio power inside the evacuated work chamber. Main objective is to study dust plasma crystallization processes at a specified power of HF discharge, pressure, and a varied number of particles with subsequent reduction of HF discharge power, then to observe melting of the structures formed earlier.]*

After the spacewalk, Lopez-Alegria reconfigured the EVA photo cameras, and Tyurin returned the two Russian “Pille-MKS” radiation dosimeters A0309 & A0310

from the EMUs, took their readings and those of the third "control" sensor A0307 (located in the SM), and restowed the dosimeters. The measurements will be downloaded to Earth.

Turning to the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, the FE-1 used the Nikon-D1X still camera to take the periodic photography of the setup, including the growth of the barley and pea seeds in the Lada-10 greenhouse. The images were then copied to the RSK1 laptop for subsequent downlink to TsUP-Moscow via BSR-TM or OCA.

Working from the discretionary Russian "job jar" list, Misha performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A second voluntary task remaining open on the Russian crew-choice list is to search for and audit available CO<sub>2</sub> filters. *[Nine filters were delivered on 6/24/06 by Progress M-57 but never used. Besides, there is a great number of used filters on the ISS (about 15 items), which are stowed both as loose items and in bags. It is impossible to distinguish visually used filters from the new.]*

During mask prebreathe this morning, the crew reported failure of a QDMA (Quick-Don Mask Assembly). The mask was temporarily fixed, and prebreathe was extended by several minutes to make up for the 1.5-min. interruption in direct O<sub>2</sub> flow. *[The failed QDMA will have to be replaced to keep an adequate quantity of masks on board for EVAs and emergencies.]*

After yesterday's standard calibration of the Soyuz 13S BILU linear accelerometer (~7:13am-10:30am), TsUP today (~1:00am-9:00am) deactivated/reactivated the BITS2-12 onboard telemetry system for troubleshooting the 1<sup>st</sup> string of the Regul radio control & communications system (RSUS). Crew involvement was not required. *[BILU works with the DM's "Argon" and KS-020M computers during the orbital free flight and subsequent reentry phases. Regul is the nominal uplink path for all Russian commands and is the only subsystem that operates using the KRL (Command Radio Uplink) which operates at a low data rate and is equivalent to the U.S. S-band system.]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:31am EST [= epoch]*):

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Apogee height -- 350.2 km  
Perigee height -- 321.6 km  
Period -- 91.25 min.  
Inclination (to Equator) -- 51.64 deg  
Eccentricity -- 0.0021268  
Solar Beta Angle -- 36.5 deg (magnitude peaking)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 215 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47044

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

02/22/07 -- Russian EVA 17a (Progress antenna removal etc., 3:30am, 6h)  
03/02/07 -- ISS reboost (delta-V~2.1 m/s)  
03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)  
03/17/07 -- STS-117/13A docking  
03/24/07 -- STS-117/13A undocking  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
09/02/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/03/07 -- Progress M-61/26P launch  
09/05/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/01/07 -- Progress M-61/26P undocking (DC1)

10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port)  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/07/07  
**Date:** Wednesday, February 07, 2007 2:57:57 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/07/07**

All ISS systems continue to function nominally, except those noted previously or below.

Crew wake/sleep cycle remains shifted at 3:30am–7:00pm EST.

After wakeup, before breakfast & first exercise, Michael Lopez-Alegria and Sunita Williams started preparations for tomorrow's EVA-8 by completing another pre-spacewalk session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

Afterwards, the CDR (EV1) and FE-2 (EV2) reviewed the final procedures/timeline for tomorrow's EVA, prepared & configured the Airlock Equipment Lock (A/L E/L) for the spacewalk, including the SSC (Station Support Computer) A31p laptop selected for the campout.

The two spacewalkers also terminated the EMU battery charging in the BSA (Battery Stowage Assembly), installed the freshly regenerated Metox (metal oxide) canisters in the spacesuits, initiated DCS (Digital Camera System) battery charging and configured the DCS EVA cameras.

EVA-8 will begin at ~9:00am EST and last an estimated 6h 30min. *[Main objectives are: (1) P3 RJMC (Rotary Joint Motor Controller) shroud removal (Face 2/zenith & Face 6/nadir); (2) XPOP (X-axis perpendicular to orbit plane) shrouds*

removal & jettison overboard (Bay 20 shroud & Bay 18 shroud); (3) P3 Zenith UCCAS (Unpressurized Cargo Carriers Attachment System) deployment; (4) P5-P6 RTAS (Rockwell Truss Attach System) launch locks removal; (5) CETA (Crew External Translation Aid) cleanup (6) SSPTS cables connections; (7) Cleanup & Ingress. Possible get-ahead tasks, if time permits, would be (a) Node LAN (Local Area Network) cable routing; (b) transfer Node TS (tool stanchion) to CETA cart & APFR-4 (Articulated Portable Foot Restraint #4) to A/L for stowage; (c) remove Node handrail.]

The CDR and FE-2 also conducted tagups with EVA specialists on the ground.

In the FGB, Mike L-A deactivated the Ericsson ham radio equipment to prevent radio interference during the spacewalk.

As he did for EVA-6 and -7, Tyurin prepared three Russian "Pille-MKS" radiation dosimeters, recorded their dosages and equipped each of the two EMUs (Extravehicular Mobility Unit) with a radiation sensor (A0309 & A0310). [A third sensor, A0308, was placed in the SM for background readings.]

The FE-1 conducted the third experiment session with the Russian/German TEKh-20 Plasma Crystal-3+ (PK-3+) payload. [Right after wakeup, Mikhail again activated the PK-3/N turbopump in the Service Module (SM) Transfer Compartment (PkhO) to keep the work chamber (ZB) in the SM RO (Work Compartment) at a vacuum. Then he set up the experiment, supported by tagup with the ground via S-band. Video recording began ~4 min after experiment initiation. Today's experiment, running in automatic mode, was a repeat of the fifth modified basic experiment with 1.55  $\mu\text{m}$  particles at different pressures and RF (radio frequency) generator capacities, for a preliminary study of wave propagation. Afterwards, PK-3+ was deactivated after collected video data were transferred from the hard disk to USB stick and thence to the OCA laptop for downlinking. Later tonight (~6:55pm EST), the turbo pump will be turned off again. (Cosmonauts appreciate PK-3+ particularly because it allows them to actually see the results of their work, as opposed to past crystal growth experiments).]

After setting up the necessary pump/hose hookup, Tyurin also performed another urine transfer from seven filled EDV-U liquid waste containers to the BV2 water tank of the Progress 23P cargo ship-turned-trash can for disposal. Afterwards, Misha flushed the line with water, letting the compressor run at half speed for 4-5 minutes. [Each of the two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before receiving the liquid waste.]

In the Soyuz 13S spacecraft, Tyurin installed a protective cap on a connector, using gray tape.

Also in the Soyuz, with no crew involvement required, TsUP/Moscow performed the periodic standard calibration of the critical BILU linear accelerometer in the Soyuz 13S Descent Module (DM) via BITS2-12 onboard telemetry system in VD-SU control system mode, *[BILU works with the DM's "Argon" and KS-020M computers during the orbital free flight and subsequent reentry phases.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A transferred Misha's, Suni's and his own exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working from his "time permitting" task list, the FE-1 conducted the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley seeds in the Lada-10 greenhouse.

Also off the discretionary "job jar" list, the cosmonaut performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A third task remaining open on the Russian crew-choice list is to search for and audit available CO<sub>2</sub> filters. *[Nine filters were delivered on 6/24/06 by Progress M-57 but never used. Besides, there is a great number of used filters on the ISS (about 15 items), which are stowed both as loose items and in bags. It is impossible to distinguish visually used filters from the new.]*

The A/L "campout" of the two spacewalkers will begin tonight at 5:25pm EST with the three crewmembers going on mask prebreathe at 10.2 psi pressure. *[Campout mask prebreathe will last for 65 min, with 10.2 psi depressurization of the A/L starting after about 45 min. This will be followed by presleep and sleep, for a total time of 8h 40min at 10.2. Next step will be temporary repressurization and a crew*

*hygiene break (70 min, with mask prebreathe) at 4:00am. Time required for EVA preparations, purge, prebreath and depress will be 3h 10min.]*

Today's CEO (Crew Earth Observation) photo targets in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Perth, Australia** (*Perth is the largest city in Western Australia and is the fourth most populous urban area in the country. At a population of 1,477,800 [2005 estimate] Perth is one of the cities included in the ISS/CEO Urban Areas study. Cities alter surface and subsurface and hydrologic processes by replacing pervious with impervious materials, change local climate by altering surface energy balances and releasing various pollutants into the atmosphere. Detailed mapping pass through the city is highly desirable. Perth should have been almost directly under track. Center point for this target is 31.95N and 115.87E*), **Vredefort Impact Crater** (*Vredefort is one of the oldest [>2 billion years] exposed impact craters. This highly eroded crater is resembles half of a ring structure. The ISS track should have passed directly over the crater. Afternoon heating insured that the crew did not have cloud-free conditions; however, they may have been able to detect the structure through holes or gaps in the clouds. Researchers have images of this crater taken with the 250 mm lens, but few taken with longer lenses. Center point for this target is 27.05 deg South and 27.5 deg East*), and **Patagonian Glaciers** (*this was the most northern of three passes for the day. Researchers asked the crew to concentrate on the smaller glaciers on the north and east sides of the Northern Patagonian Ice Field. Clouds in the area made this target marginal; however, there may have been cloud holes or gaps that enabled the crew to see and document the smaller glaciers. The center point for this target box is 49.0S and 73.5W*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this noon, 7:39am EST [= epoch]*):

Mean altitude -- 336.1 km

Apogee height -- 350.9 km

Perigee height -- 321.4 km

Period -- 91.26 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0021959

Solar Beta Angle -- 36.1 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 106 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47029

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

02/08/07 -- US EVA-8 (9:00am)  
02/22/07 -- Russian EVA 17a (Progress antenna removal etc., 3:30am, 6h)  
03/02/07 -- ISS reboost (delta-V~2.1 m/s) **[added]**  
03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)  
03/17/07 -- STS-117/13A docking  
03/24/07 -- STS-117/13A undocking **[added]**  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
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05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
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06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
09/02/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/03/07 -- Progress M-61/26P launch  
09/05/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/01/07 -- Progress M-61/26P undocking (DC1)  
10/02/07 -- Soyuz TMA-11/15S launch  
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10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port)  
Late Oct/early Nov -- US EVA-10,-11,-12  
11/??/07 -- Progress M-62/27P launch  
01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/06/07  
**Date:** Tuesday, February 06, 2007 2:53:40 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/06/07**

All ISS systems continue to function nominally, except those noted previously or below.

Crew wake/sleep cycle remains shifted at 3:30am–7:00pm.

Cosmonaut Tyurin conducted the second experiment session with the Russian/German TEKh-20 Plasma Crystal-3+ (PK-3+) payload. *[After wakeup, the FE-1 again activated the PK-3/N turbopump in the Service Module (SM) Transfer Compartment (PkhO) to keep the work chamber (ZB) in the SM RO (Work Compartment) at a vacuum. Then he set up the experiment, supported by tagup with the ground via S-band. Video recording began ~4 min after experiment initiation. Today's experiment, running in semi-automatic mode, was performed on plasma, i.e., fine particles charged and excited by HF (high frequency) radio power inside the evacuated work chamber, with particles having a diameter of 14.9 μm at varying pressures and RF (radio frequency) generator capacities. The primary objective of the experiment is to find Type 2 phase transitions during excitation of a low-frequency alternating electrical field by generating a homogenous plasma-dust cloud (closure of void) using incremental reduction of RF generator capacity, observed via video imagery. In all, the operator had to make 4 attempts during the experiment. Afterwards, PK-3+ was deactivated after collected data were transferred from the hard disk to USB stick and thence to the OCA laptop for downlinking. Later tonight (~6:55pm EST), the turbo pump will be turned off again. (Cosmonauts appreciate PK-3+ particularly because it allows them to actually see the results of their work, as opposed to past crystal growth experiments).]*

Astronauts Lopez-Alegria & Williams continued preparations for their third spacewalk, EVA-8, on 2/8 (Thursday). Using uplinked instructional material, EV1 L-A and EV2 Suni configured the required tools and gear bundles, then reviewed the updated EVA procedures/plan, followed again by a tagup with Houston EVA specialists to discuss details of the “choreography” worked out on the ground. *[As*

*planned, EVA-8 will begin around 9:00am EST and last an estimated 6h 30m. Main objectives are (a) P3 RJMC (Rotary Joint Motor Controller) shroud removal (Face 6/ nadir); (b) XPOP (X-axis perpendicular to orbit plane) shrouds removal (Bay 20 & Bay 18); (c) P3 Zenith UCCAS (Unpressurized Cargo Carriers Attachment System) deployment; (d) P5-P6 RTAS (Rockwell Truss Attach System) launch locks removal; (e) SSPTS cables connections; (f) Cleanup/Ingress. [Possible get-ahead tasks, if time permits, would be (1) Node LAN (Local Area Network) cable routing; (2) transfer of Node TS (tool stanchion) to CETA cart & APFR-4 (Articulated Portable Foot Restraint #4) to A/L for stowage; (3) removal of a Node handrail.]*

In the U.S. Airlock (A/L), the FE-2 worked on the APFR-6 brought inside at the end of EVA-7, removing its thermal shield, and initiated EMU battery charging in the BSA (Battery Stowage Assembly), while the CDR started DCS (Digital Camera System) battery charging and terminated the regeneration “bakeout” of the reusable EMU Metox (metal oxide) CO<sub>2</sub> filter canisters.

L-A and Sunita also adjusted her BRT (Body Restraint Tether) for ball stack stiffness, based on her experience with the unit during EVA-7.

The usual private pre-EVA medical checkups for the spacewalkers will be performed later today via Ku- and S-band with NetMeeting/video.

Mikhail Tyurin terminated the bladder compression procedure on the Progress M-58/23P Rodnik BV2 water tank, preparatory to upcoming urine transfer. *[The pressurization of the collapsed bladder of the Rodnik water storage tank is conducted for several hours as a leak check prior to the liquid waste transfer to the tank for disposal. Each of the two spherical Rodnik tanks consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane.]*

The FE-2 continued the current noise-abatement outfitting of the SM, today by replacing two of its SOTR ventilation system ventilation fans (VPO7 & VGZhT2) with new units.

Tyurin also took care of the daily routine maintenance of the SM's Environment Control & Life Support System (SOZh), including its toilet system (ASU).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A transferred Misha's, Suni's and his own exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his "time permitting" task list, the FE-1 conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Also from the discretionary "job jar" list, the cosmonaut performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary task list for the duration of Expedition 14.]*

A third task remaining open on the Russian job list is to search for and audit available CO<sub>2</sub> filters. *[Nine filters were delivered on 6/24/06 by Progress M-57 but never used. Besides, there is a great number of used filters on the ISS (about 15 items), which are stowed both as loose items and in bags. It is impossible to distinguish visually used filters from the new.]*

At ~2:20pm EST, the crew downlinked greetings and congratulatory wishes for Lieutenant-General Leonid Timofeyevich Baranov, the head of the Baikonur Cosmodrome, who retires from the Russian Federation Armed Forces during a ceremony on February 9 after having worked at the Cosmodrome for over 32 years. Currently, Mr. Baranov is the first vice-president of RSC-Energia. *["...For 10 years under your direct supervision, 400 space flights, 40 intercontinental ballistic missiles, and 19 manned vehicles have been launched, including as part of the International Space Station program..."]*

Also scheduled for today, commanded by TsUP/Moscow, was the opening and pressurization of the BG1&2 and BO1&2 propellant tanks of the Progress 23 refueling system (SD) followed by prop transfer to the SM ODU (Integrated Propulsion System) tankage (BG1&2, BO1&2).

Today's CEO (Crew Earth Observation) photo targets in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Patagonian Glaciers** *(weather continues to be marginal for this area. However, there were enough breaks in the clouds that the crew may have been*

able to catch the smaller glaciers on the western and southern fringes of the Southern Patagonian Ice Field. Using the long lens for detail. Center point: 49.0S 73.5W), **Gosses Bluff Impact Crater** (this 143 million year old impact crater is situated in a broad east-west valley of the MacDonnell Range about ninety miles west of Alice Springs. Looking just left of track for a raised, circular structure about 22 kilometers in diameter between two long sets of folded ridges. Center point: 23.8S 132.3E), and **Lake Eyre, Australia** (this target is usually a large, dry lake bed and is a landmark feature of south-central Australia. It is the low point of a land-locked basin with a catchment area about one-seventh of the continent. The presence or lack of water here is indicative of Australia's drought cycles. ISS had a near nadir pass in fair weather. Concentrating on the northern and western margins looking for evidence of recent heavy rains reported to the north. Center point: 28.0S 137.5E).

CEO photography can be viewed and studied at the websites:  
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<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this noon, 7:25am EST [= epoch]):

Mean altitude -- 336.2 km  
Apogee height -- 351.0 km  
Perigee height -- 321.5 km  
Period -- 91.26 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0021982  
Solar Beta Angle -- 34.9 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.78  
Mean altitude loss in last 24 hours -- 76 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 47013

**Significant Events Ahead** (all dates Eastern and subject to change [changes are called out]):

02/08/07 -- US EVA-8 (9:00am)  
02/22/07 -- Russian EVA 17a (Progress antenna removal etc., 3:30am, 6h)  
03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)  
03/17/07 -- STS-117/13A docking  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

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05/12/07 -- Progress M-60/25P launch  
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06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
07/24/07 -- US EVA-9  
08/02/07 -- PMA-3 relocation  
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01/29/08 -- Progress M-63/28P launch

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/05/07  
**Date:** Monday, February 05, 2007 2:56:43 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/05/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 20 of Increment 14.*

Crew wake/sleep cycle remains shifted at 3:30am–7:00pm.

Before breakfast, CDR Lopez-Alegria, FE-1 Tyurin & FE-2 Williams performed the Russian biomedical routine assessments of Calf Volume Measurement (PZEh-MO-7) and Body Mass Measurement (PZEh-MO-8), fourth time for Suni, tenth time for L-A and Misha, using the IM mass measurement device, later breaking it down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference pints, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

Also before breakfast & first exercise, Lopez-Alegria and Williams completed another post-EVA session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

Mikhail Tyurin conducted his first experiment session with the Russian TEKh-20 Plasma Crystal-3+ (PK-3+) payload, after the checkout runs of the past few days. *[After wakeup, Tyurin again activated the PK-3/N turbopump in the Service Module (SM) Transfer Compartment (PkhO) to keep the work chamber (ZB) in the SM RO (Work Compartment) at a vacuum. Then he set up the experiment, supported by tagup with the ground via S-band. Video recording began ~4 min after experiment initiation. The experiment, running in automatic mode, is performed on plasma, i.e., fine particles charged and excited by HF (high frequency) radio power inside the evacuated work chamber. Today's basic experiment used a mixture of particles 14.9 μm and 3.4 μm in diameter and a mixture 9.2 μm and 3.4 μm in diameter at varying pressures and radio frequency generator outputs to do preliminary research on wave propagation, using video imagery. Afterwards, PK-3+ was deactivated after collected data were transferred from the hard disk to USB stick and thence to the OCA laptop for downlinking. Later tonight (~6:55pm EST), the turbo pump will be turned off again. (Cosmonauts appreciate PK-3+ particularly because it allows them to actually see the results of their work, as opposed to past crystal growth experiments).]*

Preparatory to today's post-EVA CO<sub>2</sub> filter regeneration activities in the Airlock, Mike L-A set up an ITCS LTL (Internal Thermal Control System/Low Temperature Loop) coolant jumper connection to the LAB1D6 rack in preparation for the (intermittent) activation of the CDRA (Carbon Dioxide Removal Assembly). *[A new patch to correct the current software problem with CDRA is expected to be delivered in a week. Flight Control teams continue to operate the unit for a few hours at a time.]*

Afterwards, the CDR started the regeneration "bakeout" of the Metox (metal oxide) CO<sub>2</sub> absorption canisters used during the EVA.

In addition, the two spacewalkers refilled the water reservoirs of their EMUs (Extravehicular Mobility Units).

L-A and Sunita Williams also conducted a review of the preliminary plan for Thursday's (2/8) EVA-8, followed up by a teleconference with MCC-H EVA specialists. *[As currently drafted, the third spacewalk by L-A (EV1) & Suni (EV2) will begin at 9:00am EST and last an estimated 6h 30m. Main objectives will be (a) P3 RJMC (Rotary Joint Motor Controller) shroud removal (Face 6/nadir); (b) XPOP (X-axis perpendicular to orbit plane) shrouds removal (Bay 20 & Bay 18); (c) P3 Zenith UCCAS (Unpressurized Cargo Carriers Attachment System) deployment; (d) P5-P6 RTAS (Rockwell Truss Attach System) launch locks removal; (e) SSPTS cables connections; (f) Cleanup/Ingress. [Possible get-ahead tasks, if time*

*permits, would be (1) Node LAN (Local Area Network) cable routing; (2) transfer of Node TS (tool stanchion) to CETA cart & APFR-4 (Articulated Portable Foot Restraint #4) to A/L for stowage; (3) removal of a Node handrail.]*

The FE-2 updated the four copies of the EMER-1 SODF (Emergency-1/Station Operations Data File) book by adding new pages and making P&I (pen & ink) changes.

In preparation for upcoming urine transfer to the Progress M-58 (23P) Rodnik BV2 water tank, Tyurin conducted six compressor test activations to inflate and pressurize the cargo ship's BV2 tank bladder. *[The pressurization of the collapsed bladder of the Rodnik water storage tank is conducted as a leak check, to last ~4h 30min, preparatory to the liquid waste transfer to the tank for disposal. Each of the two spherical Rodnik tanks consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane.]*

Misha Tyurin later worked on the SM's ASU toilet facilities systems/replaceables, performing the periodic replacement of the toilet's urine receptacle (M-P) and filter insert (F-V), plus associated hoses and a sensor, and stowing the old units for disposal. (Last time done: 1/5).

Sunita Williams conducted the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Mike L-A disassembled and stowed the FQD (Fluid Quick Disconnect) trainer, used to prepare for the outside reconfigurations of the ETCS (External Thermal Control System) Loops A and B during EVA 6 & 7 and now no longer required. *[Both external thermal cooling loops continue to operate well after the reconfigurations.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni transferred Misha's, L-A's and her own exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~2:25pm EST, the CDR has his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

Working off his "time permitting" task list, Misha Tyurin conducted the daily updating/editing of the standard IMS "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Also from the discretionary task list, the FE-1 performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

As a third voluntary job for Misha, the Russian task list today suggested the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley seeds in the Lada-10 greenhouse.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
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**ISS Orbit** *(as of this noon, 7:04am EST [= epoch]):*

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Mean altitude loss in last 24 hours -- 89 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46997

**Significant Events Ahead** *(all dates Eastern and subject to change [changes are called out]):*

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02/22/07 -- Russian EVA 17a (Progress antenna removal etc., 3:30am, 6h)  
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03/17/07 -- STS-117/13A docking  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry **[new date]**  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12) **[new date]**  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port) **[new date]**  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) **[new date]**  
05/04/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port) **[date added]**  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
07/24/07 -- US EVA-9 **[added]**  
08/02/07 -- PMA-3 relocation  
09/02/07 -- Progress M-60/25P undocking (DC1) & reentry **[new date]**  
09/03/07 -- Progress M-61/26P launch **[new date]**  
09/05/07 -- Progress M-61/26P docking (DC1) **[new date]**  
09/07/07 -- STS-120/10A -- Node 2  
10/01/07 -- Progress M-61/26P undocking (DC1) **[added]**  
10/02/07 -- Soyuz TMA-11/15S launch  
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Late Oct/early Nov -- US EVA-10,-11,-12 **[added]**  
11/??/07 -- Progress M-62/27P launch **[added]**  
01/29/08 -- Progress M-63/28P launch **[added]**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 02/04/07  
**Date:** Sunday, February 04, 2007 6:01:56 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/04/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- EVA Day #2 for the Expedition 14 crew of CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams. Ahead: Week 20 of Increment 14.*

Crew workday cycle remains shifted at 3:30am–7:00pm.

Mike Lopez-Alegria (EV1) and Sunita Williams (EV2) **successfully completed EVA-7** with A/L (Airlock) hatch closure at 3:49pm EST, followed by cleanup and post-EVA ops.

Accomplished tasks of this spacewalk were –

- Reconfigure EATCS (External Thermal Control System) Loop B heat exchanger fluid and electrical connections on starboard (during these operations, a QD {quick disconnect} showed a small leak which required the crew to perform precautionary cleanup steps to ensure no contamination was brought into the cabin; the bakeout was completed with no issues);
- Aft Radiator Preparation (survey; remove EAS M10 cap;
- Aft Radiator Retract;
- Aft Radiator cinch;
- EAS (Early Ammonia Servicer) jumper relocation;
- Retrieve APFR (Articulated Portable Foot Restraint) from PMA-1;
- SSPTS (Station/Shuttle Power Transfer System) deploy (not all the connections were completed; they will be finished during the next EVA-8. SSPTS install, to allow longer Orbiter dock times, is required prior to the 13A.1 mission);  
and
- Cleanup/Ingress.

Get-ahead tasks completed: (1) retrieval of avionics MDM (Multiplexer/Demultiplexer) sunshade (no longer required); (2) imagery survey of SAW (Solar

Array Wing) 2B.

*[Official start time of the spacewalk was 8:38am E\$T, 22 minutes ahead of schedule. Total EVA duration (PET = Phase Elapsed Time) was 7 hours 11 minutes. It was the 74<sup>th</sup> spacewalk for ISS assembly & maintenance, the 46<sup>th</sup> from the station (vs. Shuttle-based) with a total of 266 hrs 22 min, and the 27<sup>th</sup> from the "Quest" Airlock. After today's spacewalk, 51 NASA astronauts, 13 Russians and five astronauts representing Japan (1), Canada (2), France (1) and Germany (1) have logged 453 hrs 42 min outside the station on building and maintaining it.]*

Before spacewalk begin, at ~4:00am EST, C/L (Crewlock) hatch was cracked for a 70-min. hygiene break/with mask prebreathe for Mike Lopez-Alegria and Sunita Williams, after spending the night on 10.2 psi campout. At ~5:10am, the hatch was closed again for a continued depress period at 10.2, for a total time for EVA preps + EMU purge + prebreathe + depress below 10.2psi (at 8:25am) of ~3h 35 min. FE-1 Tyurin, who provided IVA (intravehicular activities) support, used a DCS 760 EVA camera for documenting the hatch closure.

Earlier, the FE-1 set up the final configuration of the STTS onboard communications system to support the EVA. After the spacewalk, the comm system was reset to the original conditions.

After wakeup, before breakfast, Mikhail Tyurin continued preparatory support of his first experiment session with the Russian TEKh-20 Plasma Crystal-3+ (PK-3+) payload, beginning tomorrow, by activating the turbopump in the SM's Transfer Compartment (PkhO) and starting the evacuation of the vacuum chamber (ZB) in the SM Work Compartment (RO), then monitoring the automated PK-3 operations. The turbopump is to be deactivated tonight at ~6:55pm EST. *[The experiment will be performed on plasma, i.e., fine particles charged and excited by HF (high frequency) radio power inside the evacuated work chamber. Main objective is to study dust plasma crystallization processes at a specified power of HF discharge, pressure, and a varied number of particles with subsequent reduction of HF discharge power, then to observe melting of the structures formed earlier.]*

Tyurin also collected the periodic cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Afterwards, the FE-1 completed today's routine maintenance of the SOZh system in the Service Module (SM), including ASU toilet facilities systems/replaceables and the weekly collection of the toilet flush (SP) counter and water supply (SVO)

readings for calldown to TsUP/Moscow.

Following post-EVA ops, CDR Lopez-Alegria reconfigured the DCS cameras for the third EVA on 2/8.

Tyurin returned the two Russian "Pille-MKS" radiation dosimeters A0309 & A0310 from the EMUs, took their readings and those of the third "control" sensor A0307 (located in the SM), and restowed the dosimeters. The measurements will be downloaded to Earth.

The FE-1 worked out for 1.5 hrs on the VELO bike with bungee cord load trainer.

Working off his discretionary "free time" task list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

Also from the task list, the FE-1 conducted the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley seeds in the Lada-10 greenhouse.

A third task remaining on the Russian task list from yesterday is to search for and audit available CO<sub>2</sub> filters. *[Nine filters were delivered on 6/24/06 by Progress M-57 but never used. Besides, there is a great number of used filters on the ISS (about 15 items), which are stowed both as loose items and in bags. It is impossible to distinguish visually used filters from the new.]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** *(all dates Eastern and subject to change [changes are called out]):*

02/08/07 -- US EVA-8 (9:00am)

02/22/07 -- Russian EVA 17a (Progress antenna removal etc., 3:30am, 6h)

03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)

03/17/07 -- STS-117/13A docking  
04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/09/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/02/07 -- Progress M-61/26P launch  
09/04/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/03/07  
**Date:** Saturday, February 03, 2007 1:20:20 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/03/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – half-day off duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams.*

Crew workday cycle remains shifted at 3:30am–7:00pm to accommodate the earlier EVA tomorrow morning.

After wakeup, before breakfast & first exercise, CDR Michael Lopez-Alegria and FE-2 Sunita Williams completed another pre-EVA session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

FE-1 Tyurin supported his first experiment session with the Russian TEKh-20 Plasma Crystal-3+ (PK-3+) payload by activating the turbopump in the SM's Transfer Compartment (PkhO) and starting the evacuation of the vacuum chamber (ZB) in the SM Work Compartment (RO), then monitoring the automated PK-3 operations. The turbopump is to be deactivated tonight at ~6:55pm EST. *[The experiment is performed on plasma, i.e., fine particles charged and excited by HF (high frequency) radio power inside the evacuated work chamber. Main objective is to study dust plasma crystallization processes at a specified power of HF discharge, pressure, and a varied number of particles with subsequent reduction of HF discharge power, then to observe melting of the structures formed earlier.]*

Mikhail Tyurin also replaced the old Russian Packet laptop with a new RSS2 A31p

machine delivered on Progress 24P, installed the laptop and tested it, supported by ground specialist tagup.

Lopez-Alegria and Williams reviewed the updated procedures/timeline for tomorrow's EVA-7, prepared and configured the Airlock Equipment Lock (A/L E/L) for the spacewalk, including the SSC (Station Support Computer) A31p laptop selected for the campout. L-A also terminated the Metox (metal oxide) canister regeneration "bakeout" in the A/L. *[With lessons learned from EVA-6, appropriate timing and procedures changes were incorporated in the EVA-7 plan. The zenith MDM (multiplexer/demultiplexer computer) sunshade will be brought inside ISS as opposed to being jettisoned (however, this task could be deferred to EVA-8). Loop B venting in support of EVA-7 was performed this morning while ISS was under RS (Russian Segment) propulsive attitude control (9:25am-10:38am EST), to lower external loop pressure from approximately 380 psi to 65 psi.]*

As currently planned, the EVA-7 by L-A (EV1) & Sunita (EV2) will begin at 9:00am EST and last an estimated 6h 15min. Main objectives are (a) EATCS (External Thermal Control System) Loop B electrical connections on starboard (Stbd); (b) Aft Radiator Preparation (survey; remove EAS M10 cap; (c) Aft Radiator Retract; (d) Aft Radiator cinch; (e) EAS (Early Ammonia Servicer) jumper relocation; (f) Retrieve APFR (Articulated Portable Foot Restraint) from PMA-1; (g) SSPTS (Station/Shuttle Power Transfer System) deploy; (h) Retrieve large cutters; (i) Cleanup/Ingress. *[Possible get-ahead tasks, if time permits, would be (1) SSPTS deploys; (2) retrieval of MDM sunshade; (3) relocate Node tool stanchion to CETA cart; (4) remove Node handrail; and (5) imagery survey of SAW (Solar Array Wing) 2B.]*

The CDR and FE-2 also conducted a tagup with EVA specialists on the ground.

In the FGB, L-A deactivated the Ericsson ham radio equipment to prevent radio interference during the spacewalk.

FE-1 Tyurin completed today's routine maintenance of the SOZh system in the Service Module (SM), including ASU toilet facilities systems/replaceables.

Sunita Williams made the rounds performing the weekly rebooting of all PCS (Portable Computer System) A31p's.

As he did for EVA-6, Tyurin prepared three Russian "Pille-MKS" radiation dosimeters, recorded their dosages and equipped each of the two EMUs (Extravehicular Mobility Unit) with a radiation sensor (A0309 & A0310). *[A third sensor, A0308, was placed in the SM for background readings.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program

(about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A transferred his, Misha's and Suni's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The FE-1 and FE-2 had their weekly PFCs (Private Family Conferences), Misha at ~7:50am EST, Suni ~9:20pm.

The "campout" of the two spacewalkers will begin at 5:25pm EST with the three crewmembers going on mask prebreathe at 10.2 psi pressure. *[Campout mask prebreathe will last for 65 min, with 10.2 psi depress starting after about 45 min. This will be followed by presleep and sleep, for a total time of 8h 40min at 10.2. Next step will be temporary repressurization and a crew hygiene break (70 min, with mask prebreathe). Time required for EVA preparations, purge, prebreath and depress will be 3h 10min.]*

Working off his discretionary "free time" task list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

A second new task added to the Russian task list is to search for and audit available CO<sub>2</sub> filters. *[Nine filters were delivered on 6/24/06 by Progress M-57 but never used. Besides, there is a great number of used filters on the ISS (about 15 items), which are stowed both as loose items and in bags. It is impossible to distinguish visually used filters from the new.]*

### **Weekly Science Update (Expedition Fourteen -- 19<sup>th</sup>)**

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* On 1/26 ALTEINO check-out was performed and photos were downlinked. Analysis of photos lead to issues of partial shielding of the particle trajectory on the ALTEINO windows and of orientation/placement of the reference dosimeters that need further assessment. Better accommodation of the facility (rotated by 180 degrees along AST x-axis) so to allow the reading of the status LED's is also under assessment.

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BASE:* Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA):* Complete.

*CBOSS (Cellular Biotechnology Support Systems):* Complete.

*CFE (Capillary Flow Experiment):* Complete.

*CULT (Cultural Factors Questionnaire):* Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test):* Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* In progress.

*EPO (Educational Payload Operation):* Complete.

*ETD (Eye Tracking Device):* Complete.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology):* Planned

*GRAVI (Threshold Acceleration for Gravisensing):* Complete.

*IMMUNO (Saliva Sampling):* Complete.

*LEUKIN:* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs". Removal of passive dosimeters from the MATRYOSHKA Phantom was performed on 12/07 and returned on STS-12A.1.

*NOA (Nitric Oxide Analyzer):* Complete.

*Nutrition:* Planned.

*PK-3 (Plasma Crystal 3):* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* Planned.

*POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G):* Complete.

*RC (Refrigerated Centrifuge):* Planned.

*RS (Renal Stone):* Planned.

*SAMPLE:* Complete.

*SEM (Space Experiment Module):* Complete.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* In progress.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Planned.

*TRAC (Test of Reaction & Adaptation Capabilities):* Complete.

*TROPI (Study of Novel Sensory Mechanism in Root Phototropism):* Complete.

*YING (Yeast in No Gravity):* Complete.

*CEO (Crew Earth Observations):* Through 1/27 the ground has received a total of 3,896 of ISS/CEO images for review and cataloging. Three excellent frames acquired in late November of the megacity of Mumbai, India have been mosaiced and will be published in NASA/GSFC's Earth Observatory website this weekend. These detailed views, acquired with the 400mm lens settings, took advantage of good light and excellent atmospheric conditions to yield our best imagery to date of this area.

Today's CEO (Crew Earth Observation) photo targets in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Roter Kamm Impact Crater, Namibia** (*this crater is young enough [3.7 million years old] to have retained a pristine shape. Although small (2.5 km diameter), it can be located just west of a prominent line of black hills. Looking a touch right. Center point 27.7S 16.3E*), **Australia desert floods** (*looking right of track for obliques [beyond a stationary cloud front almost under track] for images of this major event. Tropical storms located to the north have caused these unusual*

floods), and **Sydney, Australia** (crews seldom see Australia, but recent sleep shifts have made several targets available. Looking nadir and a touch right for Australia's premier city [4.2 million population]. Center point 33.7S 151.2E.)

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this noon, 10:46am EST [= epoch]):

Mean altitude -- 336.5 km

Apogee height -- 351.4 km

Perigee height -- 321.6 km

Period -- 91.26 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0022151

Solar Beta Angle -- 28.3 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 106 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46968

**Significant Events Ahead** (all dates Eastern and subject to change [changes are called out]):

02/04/07 -- US EVA-7 (9:00am) **[time changed]**

02/08/07 -- US EVA-8 (9:00am) **[time changed]**

02/22/07 -- Russian EVA 17a (Progress antenna removal etc., 3:30am, 6h)

03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)

03/17/07 -- STS-117/13A docking

04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/09/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

08/02/07 -- PMA-3 relocation

09/01/07 -- Progress M-60/25P undocking (DC1) & reentry

09/02/07 -- Progress M-61/26P launch  
09/04/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 02/02/07  
**Date:** Friday, February 02, 2007 3:44:15 PM  
**Attachments:**

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**ISS On-Orbit Status 02/02/07**

All ISS systems continue to function nominally, except those noted previously or below.

Crew workday cycle shifted back by 1.5 hrs to 3:30am–7:00pm to accommodate the earlier EVA on Sunday.

Preparations for the second U.S. spacewalk, EVA-7 (on 2/4), got underway. As currently planned, the EVA by Lopez-Alegria (EV1) & Williams (EV2) will begin at 8:30am EST and last an estimated 5h 5m. Main objectives are (a) EATCS (External Active Thermal Control System) Loop B electrical connections on starboard; (b) Aft Radiator Preparation (survey; remove EAS M10 cap; (c) Aft Radiator Retract; (d) Aft Radiator cinch; (e) EAS (Early Ammonia Servicer); (f) Retrieve APFR (Articulated Portable Foot Restraint) from PMA-1; (g) SSPTS (Station/Shuttle Power Transfer System) deploy; (h) Retrieve large cutters; (i) Cleanup/Ingress. *[Possible get-ahead tasks, if time permits, would be (1) SSPTS deploys; (2) retrieval of MDM sunshade; (3) relocate Node tool stanchion to CETA cart; and (4) remove Node handrail.]*

FE-1 Mikhail Tyurin continued preparations for operating the Russian/German TEKh-20 Plasma Crystal-3 Plus (PK-3+) experiment payload, supported by ground specialist tagup via S-band. *[After unstowing and setting up the hardware yesterday, leak checking of the electronics box and evacuation of the vacuum work chamber (ZB) with the turbopump, Tyurin today conducted more hardware testing and calibration, uploaded new software from a USB stick, checked out the software installation and verified the readiness of the experiment. After additional leak checking on the work chamber during the day, the FE-1 will deactivate the turbopump tonight at ~6:55pm EST. The experiment is performed on plasma, i.e., fine particles charged and excited by HF (high frequency) radio power inside the evacuated work chamber. Main objective is to obtain a homogeneous plasma dust*

*cloud at various pressures and particle quantities with or without superimposition of an LF (low frequency) harmonic electrical field. The experiment is conducted in automated mode. PK-3+ has more advanced hardware and software than the previously used Russian PKE-Nefedov payload.]*

In the "Quest" Airlock (A/L), Williams terminated the recharge process on EVA batteries in the BSA (Battery Stowage Assembly).

Also in the A/L, CDR Lopez-Alegria started Metox (metal oxide) regeneration. Although the CDRA (Carbon Dioxide Removal Assembly) is still off, CO<sub>2</sub> levels, at approximately 2.5 mmHg, are well within limits. LiOH (lithium hydroxide) filter canisters or CDRA restarts could be used for CO<sub>2</sub> control if necessary.

Afterwards, L-A and Sunita installed the batteries and Metox cans in their EMU spacesuits. They also filled the suits' water reservoirs.

The FE-2 performed the recharging of DCS camera system batteries.

An additional preparatory task for L-A and Suni was to configure their EVA tools.

FE-2 Williams performed the periodic CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout on the prime (#1044) and backup (#1051) unit. *[Suni changed out the prime unit's battery, then zero-calibrated both instruments. Following zero calibration, the backup unit was stowed, while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

Tyurin completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Misha also conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Williams did the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

L-A performed the regular bi-monthly reboot of the OCA (Orbit Communications Adapter) Comm Router and File Server SSC (Station Support Computer) laptops

The CDR also completed the periodic atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[CSA-CP measurements were gathered with the new 12A.1 units #1044 (prime) & #1051 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1009 for CO<sub>2</sub> in SM and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1044, and returned to their regular locations.]*

At ~5:15am EST, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~3:45pm, the crewmembers will have their regular weekly tagup with the Lead Flight Director at JSC/MCC-H.

At ~4:14pm, the crew will convene for their weekly teleconference with ISS Program Management at JSC/Houston via S-band/audio

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A transferred his, Misha's and Suni's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his discretionary "free time" task list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

Also from the task list, the FE-1 conducted the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted barley seeds in the Lada-10 greenhouse.

Today's CEO (Crew Earth Observation) photo targets in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Northern Amazonian fans, Brazil** (*a series of large fans, with radii >100 km extend south from the Guyana highlands. These have never been successfully imaged from low earth orbit, mainly due to persistent cloud cover. Weather was predicted to be as clear as it has been in months. Shooting a mapping swath between clouds at nadir and left of nadir. Center point 0.3N 63.3W*), and **Patagonian Glaciers** (*the southern Andes have been unusually cloudy this summer. However, a break in the cloud behind a cold front was expected to reveal the mountains south of track. The largest glaciers have already been imaged in this remote region, but images of the smaller tongues, especially on the Pacific side, are requested to complete the study. Almost every glacier in Patagonia has thinned since 1975, with the rate doubling between 1995 and 2000. Ice-front retreat documented in handheld images can be used to calculate glacier volume loss. Center point 49.0S 73.6W*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this noon, 10:39am EST [= epoch]*):

Mean altitude -- 336.6 km

Apogee height -- 351.4 km

Perigee height -- 321.7 km

Period -- 91.26 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0022119

Solar Beta Angle -- 25.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 95 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46952

**Significant Events Ahead** (*all dates Eastern and subject to change [changes are called out]*):

02/04/07 -- US EVA-7 (8:30am)

02/08/07 -- US EVA-8 (8:30am)

02/22/07 -- Russian EVA 17a (Progress antenna removal etc., 3:30am, 6h)  
03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)  
03/17/07 -- STS-117/13A docking  
04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/09/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/02/07 -- Progress M-61/26P launch  
09/04/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 02/01/07  
**Date:** Thursday, February 01, 2007 3:41:01 PM  
**Attachments:**

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### **ISS On-Orbit Status 02/01/07**

All ISS systems continue to function nominally, except those noted previously or below.

Crew workday cycle remains at 5:00am–8:30pm to accommodate the upcoming EVA-7.

Mike Lopez-Alegria (EV1) and Sunita Williams (EV2) **successfully completed EVA-6** with A/L (Airlock) hatch closure at 6:09pm EST. *[Prior to the start of A/L repress, a 30 minute "bakeout" decontamination period was completed with the crew inside the ISS A/L (per pre-planned procedures). After repressurizing the A/L to the safe pressure of 5 psi (sea level is 14.7 psi), an ammonia (NH<sub>3</sub>) detection test was performed by flowing airlock gas overboard through a Draeger sampler tube containing ammonia sensitive chemical crystals. This test detected no NH<sub>3</sub> and so full repress could be resumed, followed by additional precautionary measures.]*

Accomplished tasks of this spacewalk were –

- Reconfigure Lab Loop A Heat Exchanger Quick Disconnects (QDs). (This task configured the Lab Heat Exchanger Loop A from the EEATCS (Early External Active Thermal Control System) to the permanent ETCS (External Thermal Control System). Due to complexity of the fluid line work, this task took more time than was planned.)
- P6 Starboard PVR (Photovoltaic Radiator) Retraction and Cinch Install. (Retraction of the P6 starboard PVR was nominal and the crew then cinched the radiator with 6 cinches. This task was required to prepare the starboard PVR as a spare for future maintenance. Only one P6 EEATCS PVR is required to remain deployed once the first loop reconfiguration is complete. The Loop B EEATCS radiator will remain deployed until EVA-7 on 2/4.)
- Install P6 starboard PVR Shroud. (The starboard PVR shroud was installed. The shroud has some billowing but the fluid lines were covered.)

- The shroud is required on the starboard PVR to maintain thermal limits.)
- Initial Routing of SSPTS (Station/Shuttle Power Transfer System) W 9300 & W 9301 cables. (These cables are routed between the Lab 8A LTA (Launch to Activation) cables and the Z1. Prior to EVA-6, one of the LTA cables was routed over the Lab heat exchanger QD area. Therefore, this task was completed prior to the loop reconfiguration. SSPTS install is required prior to 13A.1 mission.)
  - EAS (Early Ammonia Servicer) fluid jumper relocation to P6. (Only one of two EAS fluid jumpers was relocated to P6, the only task not completed. The crew reported a few ammonia flakes that leaked out of a connector, which required the crew to perform precautionary cleanup steps to ensure no contamination was brought into the cabin. The relocations are required prior to EAS jettison (13A.1 stage) to save the two EAS fluid jumpers, which are required to support contingency ammonia refill of the outboard IEA (Integrated Equipment Assembly) thermal system from the ETCS.

There was no time to perform any get-ahead tasks. *[Official start time of the spacewalk was 10:14am EST. Total EVA duration (PET = Phase Elapsed Time) was 7 hours 55 minutes. It was the 73<sup>rd</sup> spacewalk for ISS assembly & maintenance, the 45<sup>th</sup> from the station (vs. Shuttle-based) with a total of 259h 11m, and the 26<sup>th</sup> from the "Quest" Airlock. After today's spacewalk, 49 NASA astronauts, 13 Russians and five astronauts representing Japan (1), Canada (2), France (1) and Germany (1) have logged 446 hrs 31 min outside the station on building and maintaining it.]*

After wakeup, before breakfast & first exercise, CDR Michael Lopez-Alegria and FE-2 Sunita Williams completed the post-EVA session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

Afterwards, the FE-2 deinstalled the IWIS (Internal Wireless Instrumentation System) equipment which measured structural dynamics data during the spacewalk.

In the A/L, Williams started the recharge process on EVA batteries in the BSA (Battery Stowage Assembly).

The also scheduled regeneration of the EMU METOX (metal oxide) CO2 filter

canisters was aborted due to the malfunction of the CDRA (Carbon Dioxide Removal Assembly) reported earlier. Opportunity for METOX regeneration remains tomorrow (Friday). *[Preliminary indication is a pump and/or fan failure flag. Teams are assessing data dumps today.]*

CDR Lopez-Alegria and FE-2 Williams reviewed the updated procedures/timeline for EVA-7, scheduled on 2/4 (Sunday).

Mikhail Tyurin worked on the Russian BIO-5 Rasteniya-2 ("Plants-2") experiment in the "Lada-10" greenhouse in the Service Module (SM), replacing pea seeds which failed to sprout with new barley seeds (large ones with attached skin and smaller ones, about 20 altogether, without seed skin). Afterwards, the FE-1 used the Nikon D1X camera with flash to take picture of the pea and barley seeds in the greenhouse for monitoring plant growth. *[Rasteniya-2 researches growth and development of plants under spaceflight conditions in the Lada-10 greenhouse. During its operation, the experiment requires regular daily maintenance of the experiment involving monitoring of seedling growth, humidity measurements, moistening of the substrate if necessary, and photo/video recording.]*

Tyurin completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Misha also conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Mike L-A and Sunita Williams completed another filling out of the regular weekly FFQ (Food Frequency Questionnaire) on the MEC (Medical Equipment Computer), his eighteenth and Suni's seventh, which keeps a personalized log of their nutritional intake over time on special MEC software. *[The FFQ, updated with the new food brought up on 12A.1, records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. IBMP/Moscow (Institute of Biomedical Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value of the crew's food intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]*

In the SM, the FE-1 removed the old Wiener laptop and replaced it with a new RSS1 A31p laptop. The installation was then tested.

L-A completed the weekly audit/inventory of the available CWCs (Contingency Water Containers) and their contents, which keeps a running account of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A transferred his, Misha's and Suni's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his discretionary "free time" task list, Tyurin performed the (now) regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

During yesterday's preparations for the EVA-6 spacewalk, the U.S. CMGs (Control Moment Gyroscopes) saturated during ETCS Loop A N<sub>2</sub> (nitrogen) venting, whereupon attitude control was handed over to the RS (Russian Segment), requiring 7.22 kg of propellants. Since similar venting is planned for Loop B on 2/3 (Saturday), teams are assessing plans to manage attitude control/venting.

No CEO (Crew Earth Observation) targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this noon, 1:12pm EST [= epoch]):

Mean altitude -- 336.7 km

Apogee height -- 351.6 km

Perigee height -- 321.7 km

Period -- 91.27 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0022282

Solar Beta Angle -- 21.7 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 130 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46938

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

02/04/07 -- US EVA-7 (8:30am)

02/08/07 -- US EVA-8 (8:30am)

02/22/07 -- Russian EVA 17a (Progress antenna removal etc., 3:30am, 6h)

03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)

03/17/07 -- STS-117/13A docking

04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/09/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

08/02/07 -- PMA-3 relocation

09/01/07 -- Progress M-60/25P undocking (DC1) & reentry

09/02/07 -- Progress M-61/26P launch

09/04/07 -- Progress M-61/26P docking (DC1)

09/07/07 -- STS-120/10A -- Node 2

10/02/07 -- Soyuz TMA-11/15S launch

10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/31/07  
**Date:** Wednesday, January 31, 2007 2:37:03 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/31/07**

All ISS systems continue to function nominally, except those noted previously or below.

Crew workday cycle remains 5:00am EST – 8:30pm to accommodate the upcoming EVA-6.

At 5:30am, C/L (Crewlock) hatch was cracked for a 70-min. hygiene break/with mask prebreathe for Mike Lopez-Alegria and Sunita Williams, after spending the night on 10.2 psi campout. At ~6:40am, the hatch was closed again for a continued depress period at 10.2, for a total time for EVA preps (6:50am, EMU purge (8:20am), prebreathe (8:35am) and depress below 10.2psi (9:25am) of ~3h 10min. FE-1 Tyurin, who is providing IVA (intravehicular activities) support, used the DCS 760 EVA camera for documenting the hatch closure.

Earlier, the FE-1 set up the final configuration of the STTS onboard communications system to support the EVA.

After the prebreathe period, EMUs were closed and switched to internal power. EVA-6 began at 10:14am, to last for an estimated 6.5 hrs. Main objectives are (a) reconfiguration of EATCS (External Active Thermal Control System) Loop A (two SSPTS [Station-to-Shuttle power transfer system] cables, gang clamp removal, Loop A fluid QDs [quick disconnects] on starboard [stbd]); (b) Stbd Radiator Preparation (shroud retrieval, PVR [photovoltaic radiator] survey); (c) Automatic Stbd Radiator Retraction; (d) Stbd Radiator Cinching; (e) Stbd Radiator Shroud Installation; (f) EAS Preparation (jumper relocation); (g) Cleanup. *[Possible get-ahead tasks, if time permits, would be (1) photo survey of the P6 2B blanket box; (2) retrieval of large cutters from the Airlock (A/L) toolbox #2 for stowage in A/L; (3) retrieval of APFR 4 (Articulating Portable Foot Restraint #4); (4) installation of Node LAN (local area network) cable; (5) removal of a Node handrail; and (6) stowage of SSPTS cable bags on the Lab. SSPTS will first be operational during mission*

*13A.1 to provide an extended docked period.]*

Mikhail Tyurin completed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown.]*

After changing the videotape recording the EVA camera views, Tyurin performed today's routine maintenance of the SOZh system in the Service Module (SM), including ASU toilet facilities systems/replaceables and today also the periodic checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

EVA-6 ingress in the Airlock, if nominal, will be at ~4:44pm, after which Misha Tyurin will reset the STTS communications system and Mike L-A will reconfigure the DCS cameras for the next EVA on 2/6.

Tyurin will return the two Russian "Pille-MKS" radiation dosimeters A0309 & A0310 from the EMUs, take their readings and those of the third "control" sensor A0307 (located in the SM), and restow the dosimeters. The measurements will be downloaded to Earth.

Misha also conducted the monthly health check on the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), ascertaining the size of the recorded data on the AST spectrometer's PCMCIA memory card by removing it and inserting it into the RSE1 laptop for "reading", then changing it out with a new card. *[ALTCRISS uses the AST spectrometer employed by VC8 guest cosmonaut Roberto Vittori last year in the DC1 for the Italian LAZIO (Low Altitude Zone/Ionization Observatory) experiment.]*

Working off his "time permitting" discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted pea seeds in the Lada-10 greenhouse.

Also from the voluntary Russian task list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

The CDRA (Carbon Dioxide Removal Assembly) experienced a failure during yesterday's startup sequence. Teams are assessing the telemetry signature and looking at options for a forward plan. CDRA is not required to support today's EVA-6, but may impact the planned METOX (Metal Oxide) regeneration activities in the following days.

No CEO (Crew Earth Observation) targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 11:31am EST [= epoch]*):

Mean altitude -- 336.8 km

Apogee height -- 351.8 km

Perigee height -- 321.9 km

Period -- 91.28 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0022313

Solar Beta Angle -- 18.0 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 215 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46921

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

01/31/07 -- US EVA-6 (10:00am)

02/04/07 -- US EVA-7 (8:30am)

02/08/07 -- US EVA-8 (8:30am)

02/22/07 -- Russian EVA 17a (Progress antenna removal etc., 3:30am, 6h)

03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)

03/17/07 -- STS-117/13A docking

04/06/07 -- Progress M-58/23P undocking (SM aft port) & reentry **[new date]**

04/07/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12) **[new date]**

04/09/07 -- Soyuz TMA-10/14S docking (SM aft port) **[new date]**

04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port) **[new date]**

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/02/07 -- Progress M-61/26P launch  
09/04/07 -- Progress M-61/26P docking (DC1)  
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10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 01/30/07  
**Date:** Tuesday, January 30, 2007 1:24:07 PM  
**Attachments:**

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**ISS On-Orbit Status 01/30/07**

All ISS systems continue to function nominally, except those noted previously or below. *Half-off duty day.*

Crew workday cycle remains at 5:00am – 8:30pm to accommodate the upcoming EVA-6.

After wakeup, before breakfast & first exercise, CDR Michael Lopez-Alegria and FE-2 Sunita Williams completed the regular monthly or pre-/post-EVA session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

In preparation for the upcoming urine transfer to the Rodnik BV2 water tank of Progress M-58 (23P), Mikhail Tyurin set up the necessary "plumbing" to the compressor and then inflated and pressurized the cargo ship's BV2 tank bladder. *[The pressurization of the collapsed bladder of the Rodnik water storage tank is conducted as a leak check, to last ~4h 30min, preparatory to the liquid waste transfer to the tank for disposal. Each of the two spherical Rodnik tanks consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane.]*

CDR Lopez-Alegria supported CDRA (Carbon Dioxide Removal Assembly) activation by the ground by powering up the AR (Atmosphere Revitalization) rack.

Preparations for the U.S. spacewalk tomorrow (1/31) continued. As currently planned, the spacewalk by Lopez-Alegria & Williams will begin at 10:00am EST and last an estimated 6h 30m. Main objectives are (a) reconfiguration of EATCS (External Active Thermal Control System) Loop A (two SSPTS, gang clamp removal, Loop A fluid QDs [quick disconnects] on starboard [stbd]); (b) Stbd Radiator Preparation (shroud retrieval, PVR [photovoltaic radiator] survey); (c) Stbd Radiator Retraction; (d) Stbd Radiator Cinching; (e) Stbd Radiator Shroud Installation; (f) EAS Preparation (jumper relocation); (g) Cleanup. *[Possible get-ahead tasks, if time permits, would be (1) photo survey of the P6 2B blanket box; (2) retrieval of large cutters from the Airlock (A/L) toolbox #2 for stowage in A/L; (3) retrieval of APFR 4 (Articulating Portable Foot Restraint #4); (4) installation of Node LAN (local area network) cable; (5) removal of a Node handrail; and (6) stowage of SSPTS cable bags on the Lab.]*

The crew and ground specialists “tied up all loose ends” for the spacewalk. L-A and Sunita completed EVA-6 tool preparations and conducted an S/G (space-to-ground) audio tagup with the ground. Uplinked procedures include activities in case of ammonia contamination and the required times for the “campout” and depressurization. *[Campout mask prebreathe will last for 65 min., with 10.2 psi depress starting after about 45 min. This will be followed by presleep and sleep, for a total time of 8h 40min at 10.2. Next step will be temporary repressurization and a crew hygiene break (70 min, with mask prebreathe). Time required for EVA preparations, purge, prebreath and depress will be 3h 10min.]*

The FE-2 set up and configured the IWIS (Internal Wireless Instrumentation System) hardware for measuring and recording structural dynamics during the spacewalk.

L-A and Suni prepared and configured the Airlock’s Equipment Lock (E/L) for the spacewalk, including the SSC (Station Support Computer) A31p laptop selected for the campout.

In the Lab module, the CDR also powered up the PCS (Portable Computer System) laptop and hooked up the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable at the RWS (Robotics Work Station) in support of tomorrow’s SSRMS video coverage of the EVA.

In the FGB, L-A deactivated the Ericsson ham radio equipment to prevent radio interference during the spacewalk.

FE-1 Tyurin completed today’s routine maintenance of the SOZh system in the Service Module (SM), including ASU toilet facilities systems/replaceables.

Misha also conducted the daily updating/editing of the standard IMS “delta” file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

In addition, the FE-1 worked on the SM’s IK0501 gas analyzer (GA) of the SOGS Pressure Control & Atmospheric Monitoring System, deactivating the unit and replacing its BF carbon dioxide (CO<sub>2</sub>) filter assembly with a new unit from FGB stowage (replaced last: 11/06/06). *[After ensuring good seals on the instrument’s base and no leaks around the installed filter, Mikhail reactivated the GA and stowed the spent BF for disposal. IK0501 is an automated system for measuring CO<sub>2</sub>, O<sub>2</sub>, and H<sub>2</sub>O in the air as well as the flow rate of the gas being analyzed.]*

Suni Williams did the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Tyurin prepared three Russian “Pille-MKS” radiation dosimeters, recorded their dosages and equipped each of the two EMUs (Extravehicular Mobility Unit) with a radiation sensor (A0309 & A0310). *[A third sensor, A0308, was placed in the SM for background readings.]*

On the TVIS (Treadmill with Vibration Isolation & Stabilization) with SLD (Subject Loading Devices) contingency configuration, FE-2 Williams performed the regular monthly maintenance, primarily inspecting the condition of the SLDs, SLD cables and SPDs (Subject Positioning Devices), lubricating as required, plus recording time & date values.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A transferred his, Misha’s and Suni’s exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his “time permitting” discretionary task list, the FE-1 removed &

replaced a ventilation fan (VPrK) in the SM aft end that in the past was reported to be not working properly, resulting in reduced air flow from the aft docked Progress cargo ships. *[The VPrK fan is the return fan that pulls the old air from the Progress (or SM PrK area when Progress not docked) back into SM RO compartment. The ventilation fan that supplies fresh air to the Progress and the SM PrK compartment continues to be operational.]*

Also from the voluntary Russian task list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

TsUP/Moscow is testing the SN- (Satellite Navigation System – M) hardware today.

Today's CEO (Crew Earth Observation) photo targets in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, was Pilcomayo River dynamics, Northern Argentina *(the Pilcomayo River is one of the largest flowing off the Andes Mts. The river is interesting because it fails to continue to the sea. Requested were images of the prominent zone where the river fails. The Pilcomayo is also interesting for having produced the largest inland delta on the planet. [One of the crew's prior imaging sessions documented the more visible but smaller Bermejo River nearby in excellent detail.]*

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 11:10a EST [= epoch]):*

Mean altitude -- 337.1 km

Apogee height -- 352.5 km

Perigee height – 321.6 km

Period -- 91.27 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0022963

Solar Beta Angle -- 14.0 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours – 135 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46905

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

01/31/07 -- US EVA-6 (10:00am)  
02/04/07 -- US EVA-7 (8:30am)  
02/08/07 -- US EVA-8 (8:30am)  
02/22/07 -- Russian EVA 17a (Progress antenna removal etc., 3:30am, 6h)  
03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)  
03/17/07 -- STS-117/13A docking  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/02/07 -- Progress M-61/26P launch  
09/04/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 01/29/07  
**Date:** Monday, January 29, 2007 3:07:40 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/29/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 19 of Increment 14. >>>Today, NASA observes the annual Day of Remembrance honoring those members of the NASA Family who lost their lives while furthering the cause of exploration and discovery. In their memory, flags across the agency are flying at half-staff.<<<*

Crew workday cycle remains at 5:00am – 8:30pm to accommodate the upcoming EVA-6.

Preparations for the U.S. spacewalk on Wednesday (1/31) continue. As currently planned, the spacewalk by Lopez-Alegria & Williams will begin at 10:00am EST and last an estimated 6h 30m. Main objectives are (a) reconfiguration of EATCS (External Active Thermal Control System) Loop A (two SSPTS, gang clamp removal, Loop A fluid QDs [quick disconnects] on starboard [stbd]); (b) Stbd Radiator Preparation (shroud retrieval, PVR [photovoltaic radiator] survey; (c) Stbd Radiator Retraction; (d) Stbd Radiator Cinching; (e) Stbd Radiator Shroud Installation; (f) EAS Preparation (jumper relocation); (g) Cleanup. *[Possible get-ahead tasks, if time permits, would be (1) photo survey of the P6 2B blanket box; (2) retrieval of large cutters from the Airlock (A/L) toolbox #2 for stowage in A/L; (3) retrieval of APFR 4 (Articulating Portable Foot Restraint #4); (4) installation of Node LAN (local area network) cable; (5) removal of a Node handrail; and (6) stowage of SSPTS cable bags on the Lab.]*

The CDR and FE-2 took care of their final scheduled EVA-6 procedure/timeline review and final EVA tool preps. They also conducted an S/G (space-to-ground audio) tagup with the MCC-Houston EVA team.

Sunita Williams installed the EHIPs (EMU Helmet Interchangeable Portable) lights on the EMUs (Extravehicular Mobility Units), initiated charging of the DCS (digital

camera system) batteries and configured the cameras for the spacewalk.

Using the "Elektronika" MultiMeter (MMTs-01), FE-1 ran a series of electrical continuity tests on the SM lighting system from the lighting switchboard and cable harness all the way to the SD1-7 lighting fixtures. *[Postponed from 12/14/06.]*

After VD-SU control mode and the BITS2-12 telemetry measurement system were powered off by the ground and demated, FE-1 Tyurin last night installed and connected a new cable on the Russian VELO cycle ergometer (VB-3). *[BITS2-12 and VD-SU were today re-mated and turned on again.]*

In support of upcoming payload operations, the FE-2 serviced the MELFI (Minus-Eighty Laboratory Freezer for ISS) by inserting a -32 degC Icepac into a Box Module for stowage in a MELFI Dewar.

As standard pre-EVA health status assessment, Lopez-Alegria and Williams took the general U.S. PFE (Periodic Fitness Evaluation), a monthly 1.5-hr. procedure to check up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (Cycle Ergometer with Vibration Isolation) in the Lab. Each assisted the other in turn as CMO (Crew Medical Officer). Readings were taken with the BP/ECG (Blood Pressure/Electrocardiograph) and the HRM (Heart Rate Monitor) watch with its radio transmitter. *[BP/ECG provides automated noninvasive systolic and diastolic blood pressure measurements while also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise.]*

As part of his regular monthly fitness evaluation, Mikhail Tyurin undertook his third session of the Russian MO-5 MedOps protocol of cardiovascular evaluation in the below-the-waist reduced-pressure device (ODNT, US: LBNP) on the VELO ergometer, assisted by L-A as CMO. *[The assessment, supported by ground specialist tagup (VHF) and telemetry monitoring (today at 1:31pm EST), uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph cuff wired to the cycle ergometer's instrumentation panels. The Chibis ODNT provides gravity-simulating stress to the body's cardiovascular/circulatory system for evaluation of Tyurin's orthostatic tolerance (e.g., the Gauer-Henry reflex) after 14 weeks in zero-G.]*

Later, the FE-1 unstowed and set up the equipment for tomorrow's (1/30) planned "Urolux" biochemical urine test (PZE MO-9) for the two spacewalkers. *[MO-9 is conducted regularly every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for US crewmembers for IMG (Integrated Medical Group) PHS evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus*

*Urolux developed originally for the Mir program. The data are then entered in the Medical Equipment Computer (MEC)'s special IFEP software (In-Flight Examination Program.)*

The FE-2 did the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Mikhail Tyurin conducted noise level measurements in the station interior, using the U.S. SLM (sound level meter) for an acoustic check pursuant to the recent installation of new sound deadening vibration isolators and air ducts with acoustic shields. The activities were supported by ground specialist tagup. The CDR later transferred the SLM data to the MEC (Medical Equipment Computer) for subsequent downlink.

On the CEVIS (Cycle Ergometer with Vibration Isolation), Sunita Williams performed the regular monthly maintenance, which deals mostly with an examination of the wire rope isolators for damage.

The CDR did the periodic (once per month) routine inspection of the RED (Resistive Exercise Device) with canister cords, squat harness components, and accessory straps, and the canister bolts for re-tightening if required.

The FE-1 today had 2 hrs reserved for unloading the Progress 24, cargo transfer and stowage, and keeping the IMS (Inventory Management System) databases updated.

Tyurin also completed today's routine maintenance of the SOZh system in the Service Module (SM), including ASU toilet facilities systems/replaceables.

Sunita Williams conducted the daily updating/editing of the standard IMS "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A transferred his, Misha's and Suni's exercise data files to the MEC

(Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his “time permitting” discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 (“Plants-2”) micro-G growth payload, including the newly planted pea seeds in the Lada-10 greenhouse.

Also from the voluntary Russian task list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary “time available” task list for the duration of Expedition 14.]*

At ~5:20am EST, L-A and Suni linked up with sailors on the USS Dwight D. Eisenhower for a special long-distance re-enlistment ceremony involving 16 sailors. The Eisenhower is the Navy's flagship for the Eisenhower Carrier Strike Group. Both L-A and Suni are graduates of the U.S. Naval Academy and Navy pilots.

No CEO (Crew Earth Observation) targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 10:16a EST [= epoch]*):

Mean altitude -- 337.2 km

Apogee height -- 352.4 km

Perigee height -- 322.0 km

Period -- 91.28 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0022661

Solar Beta Angle -- 9.8 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46889

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

01/31/07 -- US EVA-6 (10:00am)  
02/04/07 -- US EVA-7 (8:30am)  
02/08/07 -- US EVA-8 (8:30am)  
02/22/07 -- Russian EVA 17a (Progress antenna removal etc., 3:30am, 6h)  
03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)  
03/17/07 -- STS-117/13A docking  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/02/07 -- Progress M-61/26P launch  
09/04/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 01/28/07  
**Date:** Sunday, January 28, 2007 12:35:57 PM  
**Attachments:**

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**ISS On-Orbit Status 01/28/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for the Expedition 14 crew of CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams. Ahead: Week 19 of Increment 14.*

Crew workday cycle has slipped to 5:00am – 8:30pm to accommodate the upcoming EVA-6, preceded by the mask “campout”.

FE-1 Tyurin took care of the monthly recharging of the Motorola-9505 Iridium satellite phone. *[After retrieving it from its location in the Soyuz TMA-9/13S descent module (BO), Misha initiated the recharging of its lithium-ion battery, a 30-min. process, monitoring the process every 10-15 minutes as it takes place. Upon completion Misha returned the phone inside its SSSP Iridium kit and stowed it back in the BO’s operational data files (ODF) container. The satphone accompanies returning ISS crews on Soyuz reentry and landing for contingency communications with SAR (Search-and-Rescue) personnel after touchdown. The Russian-developed procedure for the monthly recharging has been approved jointly by safety officials. During the procedure, the phone is left in its fluoroplastic bag with open flap.]*

FE-2 Williams completed today’s routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables, the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

Working off his Russian “time permitting” discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 (“Plants-2”) micro-G growth payload, including the newly planted pea seeds in the Lada-10 greenhouse.

Also from the voluntary task list, Tyurin performed the regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

A third task list job for Misha today was another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the SONY PD-150P camcorder to provide diurnal and nocturnal ocean observations to record areas with intensive bio-production and associated oceanological occurrences including bio-luminescent glow of water. Diurnal: Atlantic Ocean – underwater borderline of the African continent. Nocturnal: Indian Ocean -- southwestern section and Andaman Sea near Sumatra.

The CDR and FE-2 had their weekly PFCs (Private Family Conferences), L-A at ~9:50am EST, Suni ~12:00pm.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

No CEO (Crew Earth Observation) targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:26am EST [= epoch]):

Mean altitude -- 337.3 km

Apogee height -- 352.5 km

Perigee height -- 322.1 km

Period -- 91.28 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0022638

Solar Beta Angle -- 5.4 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 102 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46871

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

01/31/07 -- US EVA-6 (10:00am)  
02/04/07 -- US EVA-7 (8:30am)  
02/08/07 -- US EVA-8 (8:30am)  
02/22/07 -- Russian EVA 17a (Progress antenna removal etc., 3:30am, 6h)  
03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)  
03/17/07 -- STS-117/13A docking  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/02/07 -- Progress M-61/26P launch  
09/04/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/27/07  
**Date:** Saturday, January 27, 2007 10:22:45 AM  
**Attachments:**

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### **ISS On-Orbit Status 01/27/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams.*

Workday cycle remains at 3:30am EST wakeup, 7:00pm sleep. It will slip to 5:00am – 8:30pm tomorrow to accommodate the upcoming EVA-6.

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, FE-1 Tyurin performed preventive maintenance cleaning on the SM and FGB ventilation system fans (Group A).

CDR Lopez-Alegria completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables.

In support of upcoming payload operations, the CDR serviced the MELFI (Minus-Eighty Laboratory Freezer for ISS) by inserting a -32 degC Icepac into a Box Module for stowage in a MELFI Dewar.

Preparations are continuing for the upcoming EVA-6. In the U.S. Airlock, FE-2 Williams terminated the EVA battery charging in the BSA (Battery Stowage Assembly). Final prep steps will be scheduled on Monday, 1/29.

Mike L-A and Sunita Williams completed another filling out of the regular weekly FFQ (Food Frequency Questionnaire) on the MEC (Medical Equipment Computer), his seventeenth and Suni's sixth, which keeps a personalized log of their nutritional intake over time on special MEC software. *[The FFQ, updated with the new food brought up on 12A.1, records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. IBMP/Moscow (Institute of Biomedical Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value of the crew's food intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]*

FE-1 Mikhail Tyurin performed the routine task of shooting two photos of the docking cone of the DC-1 Docking Compartment's port, currently occupied by the Progress M-59/24P, a standard practice after Russian dockings. These images are used to refine current understanding of docking conditions. The pictures were later downlinked via OCA assets. *[The objective is to take photo imagery of the scratch or scuff mark left by the head of the docking probe on the internal surface of the drogue (docking cone, ASP) ring, now rotated out of the passageway. As other crewmembers before him, the FE-1 used the Nikon D1X digital still camera to take two pictures each with the hatch closed down.]*

Working off his voluntary "time permitting" task list, the FE-1 used the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography for Russia's Environmental Safety Agency (ECON) of the environmental conditions of the water surface of the Gulf of Mexico, the Caribbean, the Pacific Ocean and the Gulf of California. *[KPT-3 photography is a frequent earth observing experiment for ECON.]*

Also from the Russian task list, Tyurin performed the (now) regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

A third discretionary job on the task list for Misha was to take Nikon D1X digital photography through cabin windows of the externally mounted SKK Removable Cassette Containers #5 (on the SM Assembly Compartment) and #2 (on the DC1 Docking Compartment).

All crewmembers worked out in their regular 2.5-hr. physical exercise program

(about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A transferred his, Misha's and Suni's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~11:40am, Misha Tyurin is scheduled for a private S-/Ku-band conference with friends on the ground.

At ~2:10pm, the FE-1 will downlink video greetings and good wishes to the personnel of Production Department #414 of Energia Corporation on the occasion of the 60<sup>th</sup> Anniversary of the Department, "which has made considerable contributions in the development of space rocket technology products". [*Special thanks to the veterans, who have worked practically all their lives and who are still working at Production Department #414.*"]

### **Weekly Science Update** (*Expedition Fourteen -- 18<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* ALTEINO relocation performed on 1/17. Data downlink by OCA on 1/18. Inadvertent switch-off period occurred between 1/17 and 1/18, when the ALTEINO device was found switched off. The crew powered it again, and now the ALTEINO device is working nominally - this was checked by M. Tyurin. Next ALTCRISS activities (hardware health check) are currently planned on 1/26.

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BASE:* Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA):* Complete.

*CBOSS (Cellular Biotechnology Support Systems):* Complete.

*CFE (Capillary Flow Experiment):* Complete.

*CULT (Cultural Factors Questionnaire):* Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test):* Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* In progress.

*EPO (Educational Payload Operation):* Complete.

*ETD (Eye Tracking Device):* Complete.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology):* Planned

*GRAVI (Threshold Acceleration for Gravisensing):* Complete.

*IMMUNO (Saliva Sampling):* Complete.

*LEUKIN:* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs". Removal of passive dosimeters from the MATRYOSHKA Phantom was performed on 12/07 and returned on STS-12A.1.

*NOA (Nitric Oxide Analyzer):* Complete.

*Nutrition:* Planned.

*PK-3 (Plasma Crystal 3):* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* Planned.

*POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G):* Complete.

*RC (Refrigerated Centrifuge):* Planned.

*RS (Renal Stone):* Planned.

*SAMPLE:* Complete.

*SEM (Space Experiment Module):* Complete.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* L-A and

Suni were thanked for the Actiwatch data downloaded on Thursday. The monthly Sleep Log downlink to the PI (Principal Investigator) will occur on Monday. "Any Sleep Logging above and beyond the schedule is greatly appreciated."

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* In progress.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Planned.

*TRAC (Test of Reaction & Adaptation Capabilities):* TRAC Session #2 took place last week with all 3 crew members. It seems that the "wobbling" of the table has been resolved. CSA (Canadian Space Agency) is happy that the crew members were available for the sessions and that it unfolded as planned.

*TROPI (Study of Novel Sensory Mechanism in Root Phototropism):* All TROPI data runs are now complete.

*YING (Yeast in No Gravity):* Complete.

*CEO (Crew Earth Observations):* Through 1/20, the ground has received a total of 3,532 frames of ISS/CEO imagery for review and cataloging. Very few new frames have been received since last week's report. On 1/11 during a session requested by CEO for the Northern Mariana Islands, the crew acquired a view which documented an ash plume coming from one of the two volcanoes on Pagan Island. This image will be published on NASA/GSFC's Earth Observatory website this weekend. "Nice work! We've been sending you examples of other science results and applications as we identify them."

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Tin Bider Impact Crater, Algeria** (*this 6 km-diameter crater is a prominent feature on the edge of a plateau marked with parallel wind streaks. Center point 27.6N 5.1E*), **Bosumtwi Impact Crater, Ghana** (*this 10.5 km-diameter, lake-filled crater lies just south of a major devegetated zone nearby, with Lake Volta beyond. Smoke and dust haze are likely, but this closer pass should have allowed identification of the target. Center point 6.5N 1.4W*), and **Jarvis Island, equatorial Pacific** (*this small, uninhabited island is one of many wildlife refuges in the Pacific Ocean [far south of Hawaii] managed by the US Fish and Wildlife Service. Detailed images of the fringing coral reef were requested. Looking a touch right of track. Center point 0.23S 160.02 W*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are

downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:04am EST [= epoch]):

Mean altitude -- 337.4 km  
Apogee height -- 352.8 km  
Perigee height -- 322.0 km  
Period -- 91.28 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0022882  
Solar Beta Angle -- 0.9 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 84 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 46855

**Significant Events Ahead** (all dates Eastern and subject to change [changes are called out]):

01/31/07 -- US EVA-6 (10:00am)  
02/04/07 -- US EVA-7 (8:30am)  
02/08/07 -- US EVA-8 (8:30am)  
02/22/07 -- Russian EVA 17a (Progress antenna removal etc., 3:30am, 6h)  
03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am)  
03/17/07 -- STS-117/13A docking  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/02/07 -- Progress M-61/26P launch  
09/04/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port).



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 01/26/07  
**Date:** Friday, January 26, 2007 3:28:12 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/26/07**

All ISS systems continue to function nominally, except those noted previously or below.

Workday cycle remains at 3:30am EST wakeup, 7:00pm sleep.

Preparations are continuing for the upcoming series of Stage EVAs. The CDR and FE-2 reviewed training material for the SAFER (Simplified Aid For EVA Rescue) device and ran tests on the units. *[During checkout, SAFER #1003 was found to be losing some GN<sub>2</sub> (gaseous nitrogen) due to an inhibitor valve not fully seated, even with the Manual Isolator Valve closed. As per Flight Rule, a SAFER is considered "No Go" with its GN<sub>2</sub> supply at less than 87%. The other two onboard SAFERs (#1005 & #1006) will be used by the crew during the spacewalks. The troubleshooting findings are considered beneficial for future crews in training.]*

In the U.S. Airlock (A/L), Lopez-Alegria and Williams installed fresh batteries and two METOX canisters (Metal Oxide) in their suits. *[Recyclable METOX canisters replaced the old one-way/expendable LiOH (lithium hydroxide) canisters as carbon dioxide (CO<sub>2</sub>) removal system in the EMU/spacesuits in 2001. During use, CO<sub>2</sub> is absorbed by them and later removed through a special valve opening by "baking" (heating), which takes place in a special oven in the A/L.]*

Other EVA preparations today were replacement of a broken bulb in a helmet light (EHIP = EMU Helmet Interchangeable Portable), an EVA Decontamination Drill conducted by all three crewmembers, another all-crew EVA procedures review and an EVA tagup with MCC/Houston at 2:00pm EST.

The FE-1 today had 2 hrs reserved for unloading the Progress 24, cargo transfer and stowage, and keeping the IMS (Inventory Management System) databases

updated.

The FE-2 performed her fourth periodic atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[CSA-CP measurements were gathered with the new 12A.1 units #1044 (prime) & #1051 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1009 for CO<sub>2</sub> in SM and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1044, and returned to their regular locations.]*

Cabin air readings in the ISS were also collected by Mikhail Tyurin with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Sunita Williams supported/performed activation and checkout of the VOA (Volatile Organics Analyzer) to wrap up the maintenance on the unit performed last week. The VOA is currently warmed up and in standby mode.

Mikhail completed today's routine maintenance of the SOZh system in the Service Module (SM), including ASU toilet facilities systems/replaceables.

Sunita conducted the daily updating/editing of the standard IMS "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

At ~6:15am EST, Tyurin linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations.

Suni performed the regular bi-monthly reboot of the OCA (Orbit Communications Adapter) Comm Router and File Server SSC (Station Support Computer) laptops.

The FE-1 conducted the monthly health check on the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), ascertaining the size of the recorded data on the AST spectrometer's PCMCIA memory card by removing it and inserting it into the RSE1 laptop for "reading", then changing it out

with a new card. *[ALTCRISS uses the AST spectrometer employed by VC8 guest cosmonaut Roberto Vittori last year in the DC1 for the Italian LAZIO (Low Altitude Zone/Ionization Observatory) experiment.]*

Mike L-A did the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Working off his “time permitting” discretionary task list, Misha Tyurin performed the periodic status check on the long-term BIO-5 Rasteniya-2 (“Plants-2”) micro-G growth payload, including the newly planted pea seeds in the Lada-10 greenhouse.

Also from the voluntary Russian task list, Tyurin performed the (now) regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary “time available” task list for the duration of Expedition 14.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A transferred his, Misha’s and Suni’s exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~5:45am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~1:15pm, the Expedition 14 crew will conduct the first of several “handover” activities with the Expedition 15 crew, a teleconference via S-band/audio.

At ~2:45pm, Sunita Williams is scheduled for a crew-discretionary conference with the ground.

At ~5:15pm, the crewmembers will have their regular weekly tagup with the Lead Flight Director at JSC/MCC-H.

Today's CEO (Crew Earth Observation) photo target, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, was the **Gulf of Fonseca, Cent. America** (*coastal change is progressing fast in this gulf on the Pacific side of Central America where three countries meet. Requested was the continuation of the ISS/CEO imagery session of December when part of the gulf was cloud covered. Looking left to document conversion of mangrove swampland to fishery ponds, and conversion of forested hillsides to cattle grazing land. Center point 13N 87.5W*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:43am EST [= epoch]*):

Mean altitude -- 337.5 km  
Apogee height -- 352.9 km  
Perigee height -- 322.1 km  
Period -- 91.28 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0022989  
Solar Beta Angle -- -3.7 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 80 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 46839

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

01/31/07 -- US EVA-6 (10:00am)  
02/04/07 -- US EVA-7 (8:30am)  
02/08/07 -- US EVA-8 (8:30am)  
02/22/07 -- Russian EVA 17.A (Progress antenna removal, 3:30am)  
03/15/07 -- STS-117/13A launch -- S3/S4 trusses (6:43am) **(date & time changed)**  
03/17/07 -- STS-117/13A docking **(date changed)**  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/02/07 -- Progress M-61/26P launch  
09/04/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/25/07  
**Date:** Thursday, January 25, 2007 6:55:45 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/25/07**

All ISS systems continue to function nominally, except those noted previously or below.

Sleep cycle remains at 3:30am EST wakeup, 7:00pm sleep.

Preparations are continuing for the upcoming series of Stage EVAs. The FE-2 terminated the first round of battery charging in the BSA (Battery Stowage Assembly), begun on 1/23, and started the second round.

Williams and CDR Lopez-Alegria also installed the REBA (Rechargeable EVA Battery Assembly) batteries and conducted a powered equipment test. This was followed by a checkout/test of the PGTs (Pistol Grip Tools).

Further, the FE-2 performed the degassing procedure on the two EMU PWRs (Payload Water Reservoirs), and afterwards charged the EMU LCVGs (Extravehicular Mobility Unit/Liquid Cooling & Ventilation Garments) with water.

The CDR and FE-2 later conducted an EVA procedures review based on updated uplinks and tag up with the ground.

FE-1 Tyurin continued the RS (Russian segment) noise abatement program started earlier, today installing vibration isolators and mufflers on ventilation fans in position VPO10, VPO11, and VSZP1.

Misha also performed the periodic status check of the BIO-5 Rasteniya-2 ("Plants-2") Lada-10 experiment as well as photographic imagery of the experiment using the Nikon D1X digital camera with flash and copying all photos from the memory card to the RSK1 laptop for downlink to TsUP/Moscow via the BSR-TM telemetry channel. *[Rasteniya researches growth and development of plants (peas) under spaceflight conditions in the Lada-9 greenhouse. The regular maintenance of the*

*experiment involves monitoring of seedling growth, humidity measurements, moistening of the substrate if necessary, topping off the water tank if ~20-25% of the total amount (4 liters) remains, and photo/video recording.]*

Tyurin had 1hour 40min set aside for unloading the Progress 24, cargo transfer and stowage, and keeping the IMS (Inventory Management System) databases updated.

Lopez-Alegria configured his and Suni Williams' SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) Actiwatch devices for data downloading. After the data transfers, the devices were re-initialized for another data take by the two crewmembers. The Actiwatches were later stowed. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the crewmembers' sleep/wake patterns and light exposure, they wear the special Actiwatch device which measures the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition.]*

L-A completed the weekly audit/inventory of the available CWCs (Contingency Water Containers) and their contents, which keeps a running account of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

Mikhail Tyurin completed today's routine maintenance of the SOZh system in the Service Module (SM), including ASU toilet facilities systems/replaceables.

In addition, the FE-1 conducted the daily updating/editing of the standard IMS "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Misha also completed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown.]*

At ~9:15am EST, Williams set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, power supply) and at 9:20am conducted a ham session with students of Winnebago Public School, Winnebago, Nebraska.

At ~9:30am, Tyurin configured the PAO "telebridge" hookup tested yesterday for the

whole crew to downlink greetings to the winners of the International Exhibition Expolang 2007 in Paris in mid-February under the motto "The Russian Language is the First Language for Communication in Space". Russia is invited as a guest of honor. *[According to the address by Russia's Ministry of Foreign Affairs, European competition in Russian language with an emphasis on Russia's role in space exploration - is one of the large-scale events being planned for exhibition. The grand prix for the winners of this competition would be the opportunity to participate in the telebridge with the ISS crew on the opening day. The international Russian language competition focused on space exploration will be held during the exhibition, and the spouses of the Presidents of Russian Federation and France, and A. N. Perminov (Roskosmos Director) will attend the show. "Our greetings from orbit to the participants of the 25<sup>th</sup> International Linguistic Exhibition "Expolang", where Russia and the Russian language are the guests of honor. International cooperation on the ground and in space erases the language barrier. The first road in space was build with the Russian language 45 years ago, when Yuri Gagarin became the first cosmonaut in the world. Then English, French, Spanish, and other languages followed the suit. 2007 is a special year for cosmonauts. It gathers three anniversaries linked to the beginning of human space era: 100<sup>th</sup> Anniversary of Korolev's birth, 150<sup>th</sup> Anniversary of Tsiolkovsky's birth, and 50<sup>th</sup> Anniversary of the first Earth satellite launch. Nowadays it is very important to speak and learn Russian, this language expresses cutting edge ideas in science, it is the foundation of the Great Russian culture. Our American colleagues-astronauts on the station love the Russian language. We are happy that 2007 is announced as a world's year of the Russian Language."]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni transferred her, Misha's and L-A's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Working off his discretionary "free time" task list, Tyurin performed the (now) regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

**Significant Events Ahead** (all dates Eastern and subject to change *[changes are*

*called out*):

01/31/07 -- US EVA-6 (10:00am) **(time added)**  
02/04/07 -- US EVA-7 (8:30am) **(time added)**  
02/08/07 -- US EVA-8 (8:30am) **(time added)**  
02/22/07 -- Russian EVA 17.A (Progress antenna removal, 3:30am) **(time added)**  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (6:17am) **(time changed)**  
03/18/07 -- STS-117/13A docking (2:00pm)  
03/24/07 -- STS-117/13A undocking (10:05pm) **(added)**  
03/27/07 -- STS-117/13A landing (1:32pm) **(added)**  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
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09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/24/07  
**Date:** Wednesday, January 24, 2007 4:15:03 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/24/07**

All ISS systems continue to function nominally, except those noted previously or below.

Sleep cycle remains at 3:30am EST wakeup, 7:00pm sleep.

Preparations are continuing for the upcoming series of Stage EVAs. After FE-2 Williams set up the CBT (computer-based training) for the SAFER (Simplified Aid For EVA Rescue) hardware, she and CDR Lopez-Alegria went through the training course.

The CDR also set up and worked on the specific FQD (Fluid Quick Disconnect) training for the outside reconfigurations of the ETCS (External Thermal Control System) Loops A and B during EVA 6 & 7.

Later in the day, the crewmembers had time set aside for familiarizing themselves with the C&W (Caution & Warning) system of the EMUs (Extravehicular Mobility Units). They also reviewed the training for aiding a crewmate incapacitated by decompression sickness and using the BTA (bends treatment adapter) hardware.

Afterwards, Mike L-A and Sunita reviewed the updated EVA timeline and tagged up with the ground to discuss a number of questions uplinked beforehand, addressing General Items, Systems Issues, EVA-6, EVA-7, EVA-8, and items, such as get-aheads, that are still in work by ground specialists. Final EVA tool conference is scheduled for next Monday, 1/29. In addition, time was reserved for a crew discussion, including the FE-1, of EVA drill interaction.

FE-1 Tyurin continued the RS (Russian segment) noise abatement program started earlier, today changing out fans and installing mounting brackets, vibration isolators and mufflers for the VPO8 and VPO9 ventilation positions.

Suni Williams completed today's routine maintenance of the SOZh system in the Service Module (SM), including ASU toilet facilities systems/replaceables and today also the periodic checkout/verification of IP-1 airflow sensors in the various RS hatch openings (8) in the SM, FGB and DC1.

In addition, the FE-2 conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The CDR updated the U.S. ODF (Operations Data File) procedures in the three hardcopy Warning Books with newly uplinked pages.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni transferred her, Misha's and L-A's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~9:00am EST, Suni set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, power supply) and at 9:05am conducted a ham session with students of École élémentaire publique Le Prélude, in Ottawa, Ontario/Canada.

At ~9:10am, Misha Tyurin set up and ran through a PAO downlink session testing a "telebridge" hookup scheduled for tomorrow for the whole crew with the winners of the International Exhibition Expolang 2007 in Paris in mid-February under the motto "The Russian Language is the First Language for Communication in Space". Russia is invited as a guest of honor. *[According to the address by Russia's Ministry of Foreign Affairs, European competition in Russian language with an emphasis on Russia's role in space exploration - is one of the large-scale events being planned for exhibition. The grand prix for the winners of this competition would be the opportunity to participate in the telebridge with the ISS crew on the opening day. The international Russian language competition focused on space exploration will be held during the exhibition, and the spouses of the Presidents of Russian Federation and France, and A. N. Perminov (Roskosmos Director) will attend the show. "Our greetings from orbit to the participants of the 25<sup>th</sup> International Linguistic Exhibition "Expolang", where Russia and the Russian language are the guests of honor. International cooperation on the ground and in*

*space erases the language barrier. The first road in space was build with the Russian language 45 years ago, when Yuri Gagarin became the first cosmonaut in the world. Then English, French, Spanish, and other languages followed the suit. 2007 is a special year for cosmonauts. It gathers three anniversaries linked to the beginning of human space era: 100<sup>th</sup> Anniversary of Korolev's birth, 150<sup>th</sup> Anniversary of Tsiolkovsky's birth, and 50th Anniversary of the first Earth satellite launch. Nowadays it is very important to speak and learn Russian, this language expresses cutting edge ideas in science, it is the foundation of the Great Russian culture. Our American colleagues-astronauts on the station love the Russian language. We are happy that 2007 is announced as a world's year of the Russian Language.”]*

Working off his discretionary "free time" task list, Tyurin performed the (now) regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/ temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

Also from the task list, the FE-1 was to conduct the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted pea seeds in the Lada-10 greenhouse.

*ETCS Calibration:* The ETCS (External Thermal Control System), activated during 12A.1 but not yet connected to the Lab heat exchanger system until US EVAs 6 & 7, is being tested by the ground to calibrate thermal models with real data. Today, in Part 3, the ground is testing out the ability of the FCV (Flow Control Valve) to control the temperature of the ETCS through a variety of heat loads. Most the activities take place during crew sleep.

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Nairobi, Kenya** (*nadir pass over Kenya's capital city, the largest in East Africa [population 3-4 million]. Weather was about as cloudfree as it gets*), **Mt. Kilimanjaro, Kenya** (*looking right of track for this peak which reaches 19,340 ft above sea level. Kilimanjaro ("shining mountain" in Swahili) is the highest mountain in Africa and the highest so-called free standing mountain in the world [5,000 ft from base to summit]. The peak projects far above the field of scattered fair-weather [popcorn] cumulus*), and **Mt Cameroon, Cameroon** (*Dynamic event. Mount Cameroon is seldom photographed from low earth orbit due to persistent equatorial cloud. Looking right of track towards the coast. Mt. Cameroon, the highest peak in West and Central Africa, is a volcano that erupted six times in the 20<sup>th</sup> century. Documentation of new lava flows [which threatened a village in 2000] was*

*requested. The volcano is part of a string of volcanoes that make up a line of islands offshore).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 12:22pm EST [= epoch]*):

Mean altitude -- 337.6 km

Apogee height -- 353.0 km

Perigee height -- 322.3 km

Period -- 91.29 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.002287

Solar Beta Angle -- -13.3 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 91 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46811

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

01/31/07 -- US EVA-6 (10:00am) **(time added)**

02/04/07 -- US EVA-7 (8:30am) **(time added)**

02/08/07 -- US EVA-8 (8:30am) **(time added)**

02/22/07 -- Russian EVA 17.A (Progress antenna removal, 3:30am) **(time added)**

03/16/07 -- STS-117/13A launch -- S3/S4 trusses (6:17am) **(time changed)**

03/18/07 -- STS-117/13A docking (2:00pm)

03/24/07 -- STS-117/13A undocking (10:05pm) **(added)**

03/27/07 -- STS-117/13A landing (1:32pm) **(added)**

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

06/01/07 -- Russian EVA-18

06/07/07 -- Russian EVA-19

05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/02/07 -- Progress M-61/26P launch  
09/04/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/23/07  
**Date:** Tuesday, January 23, 2007 12:58:19 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/23/07**

All ISS systems continue to function nominally, except those noted previously or below.

Work/sleep cycle remains at 3:30am EST wakeup, 7:00pm sleep.

CDR Lopez-Alegria continued the RS (Russian segment) noise abatement program started earlier by FE-1 Tyurin, by replacing three fans with new units plus installing vibration isolation mounts at the VPO2, VPO3, and VPO4 ventilation positions behind panels in the Service Module (SM). Noise dampening for VPO1 in the SM PkhO (Transfer Compartment) was installed by Thomas Reiter on 10/12. *[Another isolation mount, with arm and jumper, will be installed tomorrow.]*

Continuing the time-consuming work on readying the Russian ASN-M Satellite Navigation System for the European ATV (Automated Transfer Vehicle) prox ops, Tyurin conducted a checkout of AFU (antenna feeder unit) circuit connections after the 12/1/06 replacement of a transmission cable. Continuity and radio frequency (RF) performance were tested with a "Standing Wave Coefficient" (KSV) test using the FSH3 spectrum analyzer from the GTS (Global Timing System). *[ASN-M will be required for prox ops during the arrival of the European ATV (Automated Transfer Vehicle) "Jules Verne" next year.]*

In preparation for the upcoming US Stage EVAs, FE-2 Williams worked in the Airlock (A/L) to initiate the ionic and particulate filtration or "scrubbing" process of the EMU (Extravehicular Mobility Unit) and A/L cooling loops, for elimination of any biomass residues. About 2 hours later, the procedure was terminated.

Sunita also initiated recharging of the EVA batteries in the A/L BSA (Battery Stowage Assembly). *[In preparation for the Stage spacewalks from the A/L, all of the EVA batteries (some prime, some backup) must be charged.]*

Suni Williams performed the monthly PEP (Portable Emergency Provisions) safety inspection, her second. *[The IMS (Inventory Management System)-supported inspection involves verification that PFEs (Portable Fire Extinguishers), PBAs (Portable Breathing Apparatus), QDMAs (Quick-Don Mask Assemblies) and EHTKs (Extension Hose/Tee Kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware. In the U.S. segment (USOS), there are a total of 5 PFEs and 7 PBAs, plus 7 QDMAs and 4 EHTKs. In the Node, Williams made sure that no more than three PBA bottles are stowed in the locker, to reduce the risk of getting too much oxygen concentration inside the stowage area in case of bottle leakage. ]*

Later, the FE-2 printed out new ODF (Operations Data File) procedures which had arrived on Progress M-59/24P, for insertion in the appropriate procedures/warning books.

The crew spent three hours in the TMA-9/13S Soyuz Descent Module (SA) to conduct the emergency descent drill, a standard training exercise for every crew returning on a Soyuz. The exercise, which strictly forbids any command activation (except for switching the InPU display), was supported by a tagup and discussions with ground instructor at TsUP/Moscow via S-band. *[The session included a review of the pertinent ODFs, specifically the books on Soyuz Ascent & Descent Procedures, Emergency Descents, and Off-Nominal Situations, crew responsibilities when executing the flight program, visual crew recognition of SUS (Entry Control System) failures, spacesuit procedures, etc., with special emphasis on operations with the Neptune-ME cockpit console. The training uses a Descent Simulator application on the RSK1 laptop.]*

Mike L-A conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Working off his discretionary "free time" task list, Tyurin performed the (now) regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

Also from the task list, the FE-1 was to search for two air duct sections for installation in Progress M-59.

All crewmembers worked out in their regular 2.5-hr. physical exercise program

(about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni transferred her, Misha's and L-A's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Later tonight, TsUP-Moscow will conduct the standard dynamic (hot firing) testing of Progress M-59 thruster systems. *[After pressurization of the Progress BG1,2 & BO1,2 resupply propellant tanks at 2:36pm EST, ISS attitude control will be handed over to the Russian MCS (motion control system) at ~3:20pm. There will be two test firings of Progress DPO (approach & attitude control) thrusters, each of 20 second duration: at 4:12pm using Progress DPO manifold #1 and at 5:47pm on manifold #2. Control authority will then be returned to the U.S. segment (USOS).]*

*ETCS Calibration:* The ETCS (External Thermal Control System), activated during 12A.1 but not yet connected to the Lab heat exchanger system until US EVAs 6 & 7, is being tested by the ground to calibrate thermal models with real data. Today, in Part 2, the radiators are being positioned at a variety of thermal environments by rotating and parking the TRRJ (Thermal Radiator Rotary Joint) at three progressively colder positions. Tomorrow, Part 3 will test out the ability of the FCV (Flow Control Valve) to control the temperature of the ETCS through a variety of heat loads. Most the activities take place during crew sleep.

Today's CEO (Crew Earth Observation) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Lake Nasser, Toshka Lakes, Egypt** (*imagery of the eastern lakes is still requested. Crew was asked to document lake levels starting with Lake Nasser on the Nile and work closer to track. Center point 23N 31.5E*), and **Somalia Coast** (*vegetation response to recent heavy flooding was requested. Shooting a mapping swath near nadir along track as far as the coast [or until the crew sees near-coastal cloud]. Center point 2.8N 46.4E*).

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 11:55am EST [= epoch]*):

Mean altitude -- 337.7 km  
Apogee height -- 353.1 km  
Perigee height -- 322.4 km  
Period -- 91.29 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0022827  
Solar Beta Angle -- -18.2 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 85 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 46795

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

01/31/07 -- US EVA-6  
02/04/07 -- US EVA-7  
02/08/07 -- US EVA-8  
02/22/07 or 02/26/07 -- Russian EVA "17.A" (Progress antenna removal)  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (6:20am)  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 01/22/07  
**Date:** Monday, January 22, 2007 3:37:20 PM  
**Attachments:**

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**ISS On-Orbit Status 01/22/07**

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 18 of Increment 14.*

Sleep cycle remains at 3:30am EST wakeup, 7:00pm sleep.

Before breakfast, CDR Lopez-Alegria, FE-1 Tyurin and FE-2 Williams performed the Russian biomedical routine assessments of Calf Volume Measurement (PZEh-MO-7) and Body Mass Measurement (PZEh-MO-8), third time for Suni, ninth time for L-A and Misha, using the IM mass measurement device, later breaking it down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference pints, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

The CDR conducted noise level measurements in the station interior, using the U.S. SLM (sound level meter) for a 90 min acoustic survey to measure background noise after the recent installation of new sound deadening vibration isolators and air ducts with acoustic shields. SLM data were transferred to the MEC (Medical Equipment Computer) for subsequent downlink.

On the HRF-2 (Human Research Facility 2) rack, FE-2 Williams broke out and installed the OUM-PFE (Oxygen Uptake Measurement/Periodic Fitness Evaluation) equipment to obtain measurements on herself according to protocol, with Lopez-

Alegria acting as OUM-PFE operator. The operations were documented with photo and video. Afterwards, Suni updated the evaluation protocol, deactivated & stored the gear, including photo/video equipment, and powered down the OUM-PFE laptop.

Working in the newly arrived 24<sup>th</sup> Progress cargo ship, FE-1 Tyurin installed the standard US-21 matching unit, a 1-hr. task. He then completed the electronic integration of 24P into the ISS by installing the LKT local temperature sensor commutator (TA251MB) of the BITS2-12 onboard telemetry measurement system, along with its ROM unit (read-only memory, TA765B). The LKT was subsequently switched on by the ground to complete the basic configuration. *[The US-21 matching unit connects the SM with the Progress motion control and DPO thrusters systems, so that they can be commanded by the SM computer system (BVS). After bolting the box down, Misha hooked up its the telemetry (TM) connector to the BITS2-12 onboard TM system on Go from TsUP, after Moscow had inhibited data output to the VD-SU control system mode, powered off the BITS and deactivated the SKV-1 air conditioner. These systems were subsequently turned back on.]*

Afterwards, the FE-1 retrieved the BIOTREK payload from 24P and transferred it to the DC1 to set up the BIOECOLOGIA kit #6, after taking documentary photographs of the items with the Nikon D1X. *[BIOECOLOGIA-6 (BTKh-14) studies the correlation between changes in genetic properties, producing capacity of recombinant strains and impact of heavy charged particles of cosmic radiation.]*

CDR Lopez-Alegria and FE-2 Williams reviewed a revised top-level spacewalk summary prepared by ground specialists detailing new tasks and structuring of the upcoming EVAs 6, 7, & 8.

Mike L-A also performed the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

After making the necessary pump/hose connections, Mikhail Tyurin conducted transfer of urine from six filled EDV-U liquid waste containers to the BV1 water tank of the Progress 23P cargo ship-turned-trash can for disposal. *[Each of the two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before receiving the liquid waste.]*

L-A completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities

systems/replaceables.

The CDR also conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Sunita performed the periodic USOS hatch seal inspection in the Node (forward, aft starboard), Lab (aft) and Joint Airlock, in support of ACS (atmospheric control system) maintenance.

L-A completed the combined weekly and monthly maintenance of the TVIS treadmill, consisting of an inspection for damage of the Russian and U.S. tie-down harnesses (straps & buckles), the associated SBS (Series Bungee System) as well as the condition of the SLDs (Subject Loading Devices), SLD cables and SPDs (Subject Positioning Devices), lubricating as required, plus recording time & date values. The inspection also included a 5-minute roller bearing inspection due to the fact that the operational life of the roller bearings is coming to an end.

Misha Tyurin transferred from 24P and replaced new Russian ODF (Operations Data Files) and updates in five on-board books (Medical Experiments/2, Technical Experiments, Biological Experiments, TORU, Progress M-59/24P Cargo Transfer Ops).

Working off his discretionary "free time" task list, the FE-1 conducted the periodic status check on the long-term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted pea seeds in the Lada-10 greenhouse.

Also from his task list, Tyurin performed the (now) regular checkup on the Japanese experiment GCF-JAXA (Granada Crystallization Facility) in the Russian TBU incubator, maintained at +20 degC, including a temperature check on its ART (automatic temperature recorder). *[This is a daily monitoring/temp checking, carried on the Russian voluntary "time available" task list for the duration of Expedition 14.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (FE-1, FE-2, CDR), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A transferred his, Misha's and Suni's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the

HRM storage medium (done six times a week).

At ~11:40am EST, CDR Mike Lopez-Alegria and FE-2 Suni Williams conducted an interactive PAO/TV interview exchange with Martha Stewart on the "Martha Stewart Show".

At ~5:30pm, the crew will hold their standard weekly teleconference with the JSC Astronaut Office (Steven Lindsey [STS-121 Shuttle CDR]), via S-band S/G (space-to-ground).

*Station Attitude:* The ISS is in +XVV +ZLV (+x-axis in velocity vector/+z-axis in local vertical) Momentum Management TEA (torque equilibrium attitude) until the Progress 24P thrusters test on 1/23.

*ETCS Calibration:* The ETCS (External Thermal Control System), activated during 12A.1 but not yet connected to the Lab heat exchanger system until US EVAs 6 & 7, is being tested by the ground to calibrate thermal models with real data. Today, in Part 1, the ground is slowly increasing the flow through the radiators to determine the minimum flow required to accurately discern the temperature of the ammonia in the radiators. Tomorrow, for Part 2, the radiators will be positioned at a variety of thermal environments by rotating and parking the TRRJ (Thermal Radiator Rotary Joint) at three progressively colder positions. Part 3, on 1/24, will test out the ability of the FCV (Flow Control Valve) to control the temperature of the ETCS through a variety of heat loads. Most the activities take place during crew sleep.

*Electrical Potential Measurements:* Today, the FPMU (Floating Potential Measurement Unit) is to be activated to collect data on the electrical potential of the ISS relative to the space environment. These measurements will help the engineering community assess the required hazard controls for PCU (Plasma Contactor Unit) operations during EVAs. The FPMU data will be used to validate ground models and measure the relationship between the PCU emission current and the actual space environment.

*CMG-3 Testing:* The ground will perform some more CMG-3 (Control Moment Gyroscope 3) testing today to gather additional data on the state of the accelerometer and lubrication of the spin bearings. During the test, CMG-3 will be spun up to 650 rpm and let coast down to zero. While it coasts down, the CMG inner gimbal will be commanded through 360 deg. The test will be repeated multiple times at different gimbal rates.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:52am EST [= epoch]*):

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Apogee height -- 353.3 km  
Perigee height -- 322.4 km  
Period -- 91.29 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0022985  
Solar Beta Angle -- -23.2 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 85 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 46776

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

01/31/07 -- US EVA-6  
02/04/07 -- US EVA-7  
02/08/07 -- US EVA-8  
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06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
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**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 01/21/07  
**Date:** Sunday, January 21, 2007 3:28:41 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/21/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for the Expedition 14 crew of CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams. Ahead: Week 18 of Increment 14.*

Sleep cycle adjustment has moved back to the interim 3:30am EST wakeup, 7:00pm sleeptime.

After wakeup, FE-2 Williams had the last day of her second seven-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight), performing sleep log and questionnaire entries in the experiment's laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the FE-2's sleep/wake patterns and light exposure, she is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as her patterns of sleep and activity throughout the Expedition.]*

For CDR Lopez-Alegria, it was a repeat of the first day of his third run with the NASA/JSC experiment NUTRITION with regard to the collection of blood samples, after 8 hour fasting, which had run into a snag on 1/18 for him and FE-2 Williams. *[After the blood collection by Williams, samples were first spun in the RC (Refrigerated Centrifuge) and then placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. L-A now has one NUTRITION session remaining for Increment 14 to complete the 180-day collection requirement. This session will be combined with a Renal Stone session after Flight 13A. Sunita Williams has three sessions remaining for NUTRITION, of which two will occur during Inc.14 and the final session during Inc.15.]*

The crew conducted the regular weekly three-hour task of thorough station

cleaning. *["Uborka", normally done on Saturdays, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution (not "Fungistat" disinfectant as erroneously stated in previous Saturday reports); also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, FE-1 Tyurin performed preventive maintenance cleaning on the FGB (*Funktsionalnyi-Grusovoi Blok*) ventilation system's mesh screens of the central fans (TsV1 & TsV2), as well as on the V3 screen in the DC1 Docking Compartment.

Misha also searched for and gathered four new vibration isolation mounts, three fans, an arm and a jumper cable for the VPO2, VPO3, and VPO4 ventilation positions behind panels in the SM PkhO (Service Module Transfer Compartment). *[The three fans and their isolators will be installed on 1/23, another isolation mount, with arm and jumper, on 1/24.]*

Sunita Williams retrieved and stowed the two FMKs (Formaldehyde Monitoring Kits) deployed by her on 1/17 in the Lab (below CEVIS cycle) and SM (most forward handrail). *[This activity was originally scheduled on 1/19.]*

Mike L-A performed troubleshooting on the ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, restarting the experiment's DAU (Data Acquisition Unit) after a lockup of the hardware's CPU (Central Processing Unit). *[This activity required prior swapping of the ER4 (EXPRESS Rack 4) power channels. ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Suni completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables, the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

Working off his discretionary "free time" task list, Misha Tyurin conducted the periodic check of the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the MATRYOSHKA-R payload in the DC1 Docking Compartment. *[The reader automatically records radiation readings at strictly defined times (:00, :15, :30, :45 minutes). The complex Matryoshka payload suite is designed for sophisticated radiation studies. The payload collects radiation measurements every 15 minutes of each hour around the clock. Note: Matryoshka is the name for the traditional Russian set of nested dolls, also called Babushka*

*dolls when they are little old ladies (“grandmas”).]*

Also suggested in Tyurin’s voluntary task list for today was the periodic status check on the long-term BIO-5 Rasteniya-2 (“Plants-2”) micro-G growth payload, including the newly planted pea seeds in the Lada-10 greenhouse.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exercise device (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1). *[Trivia note of interest: During his last 13 exercise sessions on the TVIS treadmill, Mikhail Tyurin covered a distance of over 60.5 km.]*

The CDR and FE-2 had their weekly PFCs (Private Family Conferences), Suni at ~11:00am EST, L-A at ~12:35pm.

*Station Attitude:* The ISS is in +XVV +ZLV (+x-axis in velocity vector/+z-axis in local vertical) Momentum Management TEA (torque equilibrium attitude) until the Progress 24P thrusters test on 1/23.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** *(as of this morning, 11:17am EST [= epoch]):*

Mean altitude -- 337.9 km

Apogee height -- 353.4 km

Perigee height -- 322.4 km

Period -- 91.29 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0023146

Solar Beta Angle -- -28.1 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 125 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46763

**Significant Events Ahead** (all dates Eastern and subject to change *[changes are called out]*):

01/31/07 -- US EVA-6  
02/04/07 -- US EVA-7  
02/08/07 -- US EVA-8  
02/22/07 or 02/26/07 -- Russian EVA "17.A" (Progress antenna removal)  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (6:20am)  
03/18/07 -- STS-117/13A docking (2:00pm)  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/02/07 -- Progress M-61/26P launch  
09/04/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 01/20/07  
**Date:** Saturday, January 20, 2007 3:19:11 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/20/07**

All ISS systems continue to function nominally, except those noted previously or below.

*Crew day was a long 15 hrs 30 min (wakeup at 6:00pm yesterday afternoon; sleep at 9:30am this morning) to accommodate 24P docking.*

***Yest kasaniye!*** Progress M-59 (24P) docked flawlessly at the Docking Compartment (DC1) port at 9:59pm EST last night, followed by docking probe retraction and hook closure (“sborka”) at 10:07pm. All Progress systems operated nominally from Automated Rendezvous start at approximately 7:40pm, Progress Kurs-A activation (8:23pm), Progress Kurs-A short test at 15 kilometers (9:12pm), and ending with the successful approach and docking. No problems were experienced with the retraction of the Progress KURS antenna, as observed by the ISS crew. Russian specialists later confirmed antenna retraction via telemetry. Hatches were reported open by the crew at 2:05am this morning. *[Launched on 1/17, the 24P resupply drone delivered ~2400 kg of cargo for the ISS crews, comprising 1720 lbs (780 kg) of propellant for the Russian thrusters, 110 lbs (50 kg) of oxygen and almost 3300 lbs (1497 kg) of spare parts, experiment hardware and life support components. Delivered were 45 containers of Russian food portions and 25 containers of US food. The Russian food share includes 5 containers with basic food for Expedition 14, 35 containers with basic food rations for Expedition 15; two containers with supplemental (bonus) food for Mikhail Tyurin; and three containers with bonus food for Expedition 15.]*

After wakeup last evening, FE-2 Williams had the sixth day of her second seven-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight), performing sleep log and questionnaire entries in the experiment’s laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the FE-2’s sleep/wake patterns and light exposure, she is*

*wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as her patterns of sleep and activity throughout the Expedition.]*

Before monitoring the approach & docking from the TORU station in the Service Module (SM) last night, CDR Lopez-Alegria, FE-1 Tyurin and FE-2 Williams had completed final preparations for the Progress arrival, starting with deactivation of amateur (ham) radio equipment in the ISS to prevent any interference with Progress/KURS radio traffic, and activation of the SSC6 (Station Support Computer 6) A31p laptop in the FGB for handling the video transmission from the Russian segment (RS) via the Ku-band equipment in the USOS. *[The A31p used for the routing from the SM is located in the FGB since available cables are not long enough to extend to the Node. The video signal is fed from there via coaxial cable to the SSC Operations LAN (local area network) and from there into the Ku-band system for subsequent conversion from the Russian SECAM format to the American NTSC format on the ground.]*

As docking time approached, Lopez-Alegria cleared the DC1 Docking Compartment by disassembling the air duct to the SM, removing the IP-1 air flow sensor in the passageway and installing the PkhO/DC1 hatch cover.

Mike L-A and Misha Tyurin monitored the docking process from the TORU station as Sunita took photography of the Progress approach and linkup.

After the docking, the FE-1 shut off the TORU and began reconfiguring STTS communications, with CDR Lopez-Alegria also tearing down the TV Ku-band connection through the US segment (USOS) via the A31p laptop (which was also shut down).

The crew then conducted the standard one-hour leak checking of the docking vestibule and fuel/oxidizer transfer line interface between Progress and DC1. During leak checking and initial clamp installation, Russian thrusters were inhibited (as they were during docking).

After hatch opening, the two Flight Engineers first installed the QD (quick disconnect) screw clamps (BZV) of the docking & internal transfer mechanism (SSVP) to rigidize the coupling, and Williams removed the PkhO/DC1 (SU) hatch cover, reinstalled the IP-1 airflow sensor and assembled the ventilation/heating air duct.

Next, Tyurin performed the standard air sampling inside the Progress with the Russian AK-1M air sampler, then deactivated the cargo ship.

Suni Williams meanwhile turned off and removed the US IWIS (Internal Wireless

Instrumentation System) which measured structural dynamics disturbances during the docking process.

The FE-2 also continued her support of EMCS (European Modular Cultivation System) payload operation by replacing the cooling system and air mix system supplies, the water reservoir, two filters and the sensor module.

L-A had several hours reserved for initial 24P unloading activities, while recording movements in the IMS (Inventory Management System) to update its databases.

Misha Tyurin transferred newly arrived science payloads from the Progress ship to the RS (Russian segment) and installed them for operation, then took documentary photography of the setups. *[New experiments delivered on 24P are the flown-before Japanese GCF-JAXA (Granada Crystallization Facility), set up in the Russian TBU incubator (maintained at 20 degC and checked daily, including its ART {automatic temperature recorder}); two Module-1 containers of the CRYSTALLIZER payload, installed in the thermostat-controlled CRYOGEM-03 cooler, and new material of the flown-before BIO-11 "STATOKONIA" payload with its ULITKA ("snail") incubator, working with the ART, installed in its stowage location in the SM.]*

The FE-1 also performed a quick session of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with the SIGMA 300-800 focal length lens to take pictures of the Red Sea near the coast of Egypt to obtain images showing the extent of ongoing rescue operations. *[Specific target assignments were the coastal area of Egypt, offshore area 5-8 km from the coast line (detailed photography with 800 mm focal length lens), and panoramic photography (300 mm) of the rescue area.]*

The FE-2 completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Suni also conducted the daily updating/editing of the standard IMS "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

L-A and Suni worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-2), and RED resistive exercise device (CDR, FE-2). *[Trivia note of interest: During his last 13 exercise sessions on the TVIS treadmill, Mikhail Tyurin covered a distance of over 60.5 km.]*

Afterwards, Suni transferred her and L-A's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

*NUTRITION/RENAL Sessions Update:* At this time, Lopez-Alegria has one NUTRITION session remaining for Increment 14 to complete the 180-day collection requirement. It is planned to combine this session with a Renal Stone session after Flight 13A. Williams has three total sessions remaining for NUTRITION. Two of these sessions will occur during Inc.14 and the final session during Inc.15.

*Remote Configuration Updates:* During 24P docking, the portside SARJ (Solar Array Rotary Joint) was positioned and locked, and then moded to Checkout position; BGAs (Beta Gimbal Assemblies) were moded to Directed Position. After the docking, all joints were returned to Autotrack (BGA 2A & 4A), Blind (2B) and Directed Position (4B). The Port and Starboard TRRJ (Thermal Radiator Rotary Joints), kept in Checkout mode, were unlocked and returned to Autotrack shortly after the 24P docking. S-band String 1 was activated as a hot backup. The S6 CCAA (Common Cabin Air Assembly) air conditioner fan speed was dropped to 4400 rpm, and the TCCS (Trace Contaminant Control System) was deactivated for the docking. After the docking, the CCAA fan speed went back up to nominal (5700rpm) & TCCS was reactivated.

*Attitude Update:* The ISS is in +XVV +ZLV (+x-axis in velocity vector/+z-axis in local vertical) Momentum Management TEA (torque equilibrium attitude) until the Progress 24P thrusters test on 1/23.

### **Weekly Science Update** (*Expedition Fourteen -- 17<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* ALTEINO relocation was performed on 1/17, data downlinked by OCA on 1/18. Upon reception of data, science team will assess ALTEINO functioning.

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BASE:* Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA):* Complete.

*CBOSS (Cellular Biotechnology Support Systems):* Complete.

*CFE (Capillary Flow Experiment):* Complete.

*CULT (Cultural Factors Questionnaire):* Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test):* Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* In progress.

*EPO (Educational Payload Operation):* The Teaching From Space Office thanked the crew for their outstanding participation in the EPO Demo on ECLSS this past Saturday (1/13). "Your content will be very beneficial to many different areas of education. The "morning routine" video was a great addition to the ECLSS information. Thank you for going far beyond our expectations."

*ETD (Eye Tracking Device):* Complete.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology):* Planned

*GRAVI (Threshold Acceleration for Gravisensing):* Suni Williams was thanked for carrying out the steps of the GRAVI experiment very carefully. "The hydration was very well done and good germination was obtained. The pictures you have taken are excellent and we are expecting interesting results. We thank you for inviting us on board. We really enjoyed the video!"

*IMMUNO (Saliva Sampling):* Complete.

*LEUKIN:* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs". Removal of passive dosimeters from the MATRYOSHKA Phantom was performed on 12/07 and returned on STS-12A.1.

*NOA (Nitric Oxide Analyzer):* Complete.

*Nutrition:* Planned.

*PK-3 (Plasma Crystal 3):* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* Planned.

*POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G):* Complete.

*RC (Refrigerated Centrifuge):* Planned.

*RS (Renal Stone):* Planned.

*SAMPLE:* Complete.

*SEM (Space Experiment Module):* Complete.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* In progress.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Planned.

*TRAC (Test of Reaction & Adaptation Capabilities):* Performed by all crewmembers on 1/16.

*TROPI (Study of Novel Sensory Mechanism in Root Phototropism):* All TROPI data runs are now complete.

*YING (Yeast in No Gravity):* Complete.

*CEO (Crew Earth Observations):* In progress.

Today's CEO photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Dukono Volcano, Halmahera, Indonesia** (*Dynamic event. Looking left for possible plumes from this volcano that lies at the north end of Halmahera Island. Even if no plume is seen, images of this remote volcano were requested. Scattered clouds should have allowed a view. Reports from this remote volcano are rare even though Dukono is one of Indonesia's most active volcanoes. More-or-less continuous explosive eruptions, sometimes accompanied by lava flows, occurred since 1933 until at least the mid-1990s, when routine observations were curtailed. Center point 1.7N 127.9E*), **Ganges River Delta** (*documentation of complex land use changes is requested. Looking left of track. The seaward margin of this enormous delta is protected and appears dark green due to the dense forest vegetation. Such forests originally covered the entire delta. Calcutta lies in the foreground, just left of track.*

Center point 22.5N 89.7E), and **Mt. Kilimanjaro, Kenya** (despite low level scattered cumulus, the 19,000-ft. summit of this major East African mountain should have been visible left of track. Two glaciers many thousands of years old, are expected to disappear within ~14 years at the present rate of melting. Center point 2.9S 37.2E).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:33am EST [= epoch]):

Mean altitude -- 338.0 km  
Apogee height -- 353.7 km  
Perigee height -- 322.4 km  
Period -- 91.29 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0023258  
Solar Beta Angle -- -32.1 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 133 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 46745

**Significant Events Ahead** (all dates Eastern and subject to change [changes are called out]):

01/31/07 -- US EVA-6  
02/04/07 -- US EVA-7  
02/08/07 -- US EVA-8  
02/22/07 or 02/26/07 -- Russian EVA "17.A" (Progress antenna removal)  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (6:20am)  
03/18/07 -- STS-117/13A docking (2:00pm)  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/02/07 -- Progress M-61/26P launch  
09/04/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 01/19/07  
**Date:** Friday, January 19, 2007 1:12:57 PM  
**Attachments:** [image001.gif](#)

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### **ISS On-Orbit Status 01/19/07**

All ISS systems continue to function nominally, except those noted previously or below.

*Crew day is shortened to nine hours (3:30am EST wakeup to 12:30pm sleeptime), followed by a long day of 15hrs 30min (6:00pm to 9:30am) to accommodate 24P docking tonight at 10:00pm.*

**Progress M-59/24P is continuing its rendezvous flight to the ISS.** All onboard tests (TORU, TV, etc.) have been nominal to date. The third midcourse correction burn, DV3 (0.96 m/s), was performed last night at ~9:57pm EST. 23P is currently “barbecuing” around its roll axis for thermal control. Docking is scheduled for tonight at ~10:00pm EST at the DC1 Docking Compartment port. **(See launch photo below.)**

After wakeup, FE-2 Williams had the fifth day of her second seven-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight), performing sleep log and questionnaire entries in the experiment’s laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the FE-2’s sleep/wake patterns and light exposure, she is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as her patterns of sleep and activity throughout the Expedition.]*

Before breakfast, CDR Lopez-Alegria began the second day of his third run with the NASA/JSC experiment NUTRITION, which today called for urine collections throughout the day for storage in the MELFI (Minus-Eighty Laboratory Freezer for ISS). Afterwards, the NUTRITION gear was stowed away. *[The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore,*

*additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

On the EMCS (European Modular Cultivation System), used last for the GRAVI experiment, FE-2 Williams replaced the empty AMSM (Air Mix Supply Module) supply tank with a fresh bottle and then powered down the ELC3 (EXPRESS Rack 3 laptop) computer. *[EMCS, delivered on ULF1.1, is a combination centrifuge/growth chamber that allows plant growth experiments to be carried out in controlled partial and microgravity conditions. Main research focus is on multi-generation (seed-to-seed) experiments, studies on gravity effects on early development and growth, and on signal perception and transduction in plant tropisms. Experiments with insects, amphibian and invertebrates as well as studies with cell and tissue cultures are also foreseen for EMCS.]*

At 6:50am EST, FE-1 Tyurin conducted a telecon with BIO-5 Rasteniya-2 (Plants-2) specialists to discuss resolution of an Error message displayed on the plant growth payload computer. Mikhail also performed the periodic status check of the running experiment. *[Rasteniya researches growth and development of plants (peas) under spaceflight conditions in the Lada-10 greenhouse. The regular maintenance of the experiment (each Monday, Wednesday, Friday and Sunday) involves monitoring of seedling growth, humidity measurements, moistening of the substrate if necessary, topping off the water tank if ~20-25% of the total amount (4 liters) remains, and photo/video recording.]*

Lopez-Alegria and Williams completed another filling out of the regular weekly FFQ (Food Frequency Questionnaire) on the MEC (Medical Equipment Computer), his sixteenth and Suni's fifth, which keeps a personalized log of their nutritional intake over time on special MEC software. *[The FFQ, updated with the new food brought up on 12A.1, records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. IBMP/ Moscow (Institute of Biomedical Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value of the crew's food*

*intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]*

The FE-2 set up the IWIS (Internal Wireless Instrumentation System) equipment for measuring structural dynamics data during tonight's Progress 24P docking. *[Suni reconnected the Lab and Node RSUs (Remote Sensor Units) to record data as she did for the 22P undocking two days ago.]*

Tyurin completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables. In preparation for the urine transfers to the Rodnik BV2 water tank of Progress M-58 (23P) scheduled for Monday (1/22), Mikhail also set up the necessary "plumbing" and pump connections. *[Each of the two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before receiving the liquid waste.]*

Sunita Williams retrieved and stowed the two FMKs (Formaldehyde Monitoring Kits) deployed by her 1/17 in the Lab (below CEVIS cycle) and SM (most forward handrail).

Mike L-A conducted the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

L-A also powered down the ham radio equipment in SM and FGB to prevent RF interference with the approaching Progress M-59 spacecraft during prox ops.

Yesterday's lengthy work by the crew to set up the video configuration via A31p laptop to transmit video transmission of the Progress docking to the ground was successfully completed. *[The plan is to route the three USOS external cameras to the ground and to route the best camera view based on lighting and structure to the A31p SSC6 (Station Support Computer 6). The camera view routed to the A31p SSC may be changed realtime based on the best view at the time.]*

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (CDR), RED resistive exercise device (FE-2) and VELO bike with bungee cord load trainer (FE-1). *[Trivia note of interest: During his last 13 exercise sessions on the TVIS treadmill, Mikhail Tyurin*

*covered a distance of over 60.5 km.]*

Afterwards, Suni transferred her, Misha's and L-A's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~7:30am EST, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~9:40am, the crew conducted their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

At ~10:20am, the crewmembers had their regular weekly tagup with the Lead Flight Director at JSC/MCC-H.

At ~11:55am, the CDR held a crew-discretionary conference with the ground.

Today's CEO (crew earth observations) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **B.P. Structure, Libya** (*this small structure [2 km diameter] is crudely dated as younger than 120 million years old. Dark rocks surrounding the general lighter target zone are visual cues. Suggested was to shoot several images in the general area to ensure capturing this crater. Existing images of most craters are almost always of lower resolution than that provided by handheld 400 mm lenses. Center point 25.3N 24.3E*), **Oasis Impact Crater, Libya** (*Oasis Crater, 18 km across, is dated as younger than 120 million years old. Center point 24.6N 24.4E*), and **Saharan dust, Chad** (*Dynamic event. Winter dust-generation events continue in the depression north of Lake Chad. This region is attracting increased scientific interest: latest research indicates that 40-50% of the dustfall in Amazonia is transported from this specific Saharan basin. Dust from Africa is significant for Amazon ecology because it is now known to provide most if not all of the soil nutrient to the rainforest. [Nutrients are continuously lost due to the intensive equatorial rainfall which washes nutrient into local rivers.] Astronaut handheld images of dust over Chad and over the north coast of South America are used in the recent research to help scientists visualize the intercontinental dust transport process*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are

downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:23am EST [= epoch]):

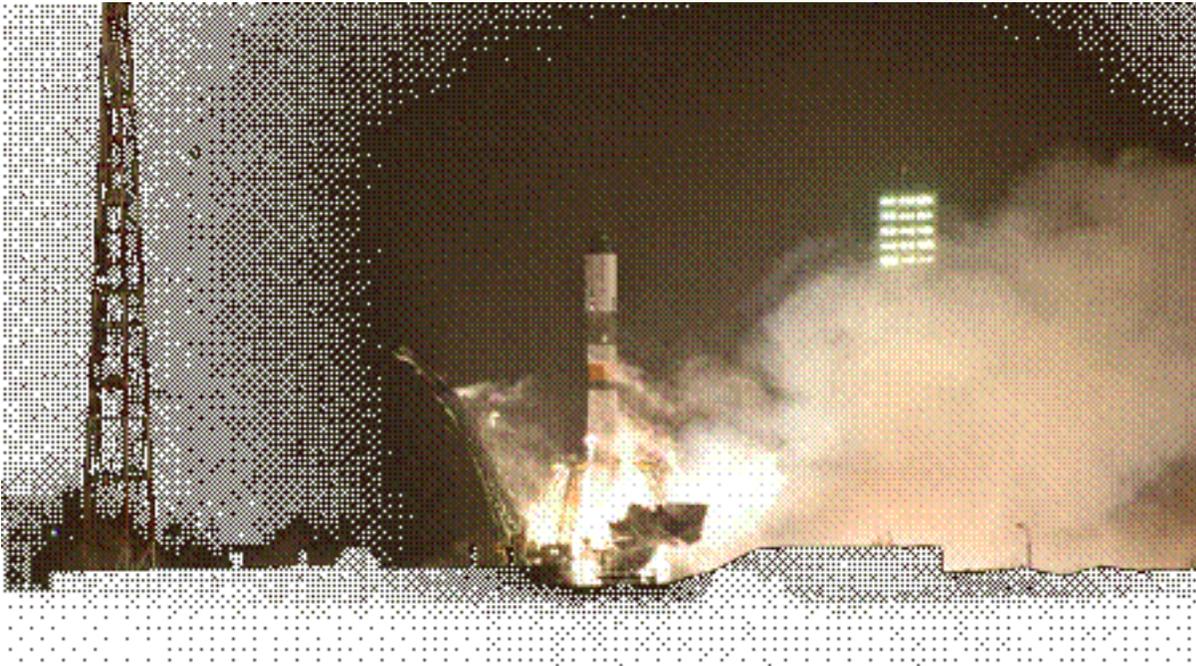
Mean altitude -- 338.2 km  
Apogee height -- 353.8 km  
Perigee height -- 322.5 km  
Period -- 91.30 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0023288  
Solar Beta Angle -- -38.1 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 158 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 46729

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

01/19/07 -- Progress M-59/24P docking (DC1, 10:00pm)  
01/31/07 -- US EVA-6  
02/04/07 -- US EVA-7  
02/08/07 -- US EVA-8  
02/22/07 or 02/26/07 -- Russian EVA "17.A" (Progress antenna removal)  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (6:20am)  
03/18/07 -- STS-117/13A docking (2:00pm)  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/02/07 -- Progress M-61/26P launch  
09/04/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)

10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port)

***Launch of Soyuz carrying Progress M-59/24P on 1/19/07 (Eastern)***



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/18/07  
**Date:** Thursday, January 18, 2007 5:13:00 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/18/07**

All ISS systems continue to function nominally, except those noted previously or below.

Adjusted sleep cycle remained at 3:30am EST wakeup, 7:00pm sleeptime (instead of 1:00am-4:30pm).

**Progress M-59 (24P) launched flawlessly last night on time at 9:12pm EST.** Separation from second and third stages was complete and nominal. Deployment of antennas and solar panels was performed nominally. 24P has a planned two-day rendezvous profile, to support docking at 10:00pm EST on Friday, 1/19. Antennas and solar arrays deployed nominally at orbit insertion (9:21pm). With that, the new cargo ship, of ~7200 kg mass including ~2400 kg of cargo, is on its way to rendezvous with ISS. *[At orbit insertion, Progress unfolded two solar arrays, four Kurs antennas, one TORU/Rassvet-M antenna and one telemetry antenna. Later, the docking probe (SSh) was extended, followed by a 6-min long self-test of both subsets of the Kurs-A MCS (motion control system) including the Klest TV system. Two orbit adjustment burns of 5 min duration each were executed, DV1 at ~1:10am EST and DV2 at ~1:40am, both with the SKD main engine. After the two-day "chaser" flight, 24P will dock at the DC1 port on 1/19 at ~10:00pm.]*

After wakeup, FE-2 Williams had the fourth day of her second seven-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight), performing sleep log and questionnaire entries in the experiment's laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the FE-2's sleep/wake patterns and light exposure, she is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as her patterns of sleep and activity throughout the Expedition.]*

Before breakfast, CDR Lopez-Alegria began the first day of his third run with the

NASA/JSC experiment NUTRITION, for which he had to forego exercising and food intake for eight hours. *[L-A started the session by collecting blood samples (assisted by FE-2 Williams), which were first spun in the RC (Refrigerated Centrifuge) and then placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. Mike L-A also started the required 24-hour data collection by securing urine specimen during the day, also stored immediately in MELFI. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R +30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

FE-1 Tyurin serviced the Russian BMP Harmful Impurities Removal System, starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The bake-out will be terminated tonight before sleep time (~5:30pm EST). *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

Mikhail Tyurin also completed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown.]*

Later, tgh FE-1 serviced the SM condensate water processor (SRV-K2M) system, today replacing the BKV water conditioning unit's BKO multifiltration/purification column with a new spare. The old unit was pre-packed for disposal. *[The SRV-K2M, with its BKO multifiltration unit, removes dissolved mineral and organic impurities from the condensate. Downstream from it, the condensate water is treated in the BKV water conditioning unit with salts for taste and silver ions for*

*preservation, before it flows to the KPV potable water container.]*

In preparation for 24P arrival tomorrow, Lopez-Alegria and Tyurin conducted a tagup with ground specialists to discuss TORU procedures. The TORU teleoperator system provides a manual backup mode to the Progress' KURS automated rendezvous radar system. The two crewmembers will be monitoring the approach and docking of Progress M-59 from the TORU station in the Service Module.

FE-2 Williams set up the SSC (Station Support Computer) A31p laptop in the FGB for handling the video transmission of the Progress docking from the Russian segment (RS) via single cable to Ku-band assets equipment in the US segment (USOS). *[This involved the removal of an Ethernet strain relief ring at SSC-6 to allow A31p video adapters mating without interference. The video arrangement was then tested by Williams and Tyurin for the docking, and the photo/TV laptop was deactivated afterwards.]*

Williams also completed the visual "T+2 Day" microbial (bacterial & fungal) analysis of the Week 17 potable water samples, collected on 1/16 by the CDR from the SRV-K hot tap and the EDV container of the water supply system (SVO-ZV), with the WMK (water monitoring kit) and MWAK (Microbial Water Analysis Kit). She then entered the microbiological data in the medical equipment computer. *[The T+2d analysis uses incubated MCDs (Microbial Capture Devices) and CDBs (Coliform Detection Bags) from the MWAK.]*

CDR Lopez-Alegria and FE-2 Williams reviewed a top-level spacewalk summary prepared by ground specialists detailing new tasks and structuring of the upcoming EVAs 6, 7, & 8. A tagup with the ground was conducted afterwards.

In preparation for upcoming urine transfers to the Rodnik BV2 water tank of Progress M-58 (23P), Mikhail set up the necessary "plumbing" to the compressor and then inflate and pressurize the cargo ship's BV2 tank bladder. *[The pressurization of the collapsed bladder of the Rodnik water storage tank is conducted in three separate operational steps as a leak check, to last ~4h 30min, preparatory to the liquid waste transfer to the tank for disposal. Each of the two spherical Rodnik tanks consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane.]*

Mikhail took the monthly sensor readings of the Pille-MKS radiation dosimetry experiment that has ten sensors placed at various locations in the RS (Russian segment; port cabin window, starboard cabin window, ASU toilet facility, control panel, etc.). Pille dosage values are called down or downlinked via Regul Paket/

Email or OCA.

The CDR performed the periodic atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[CSA-CP measurements were gathered with the new 12A.1 units #1044 (prime) & #1051 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1009 for CO<sub>2</sub> in SM and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1044, and returned to their regular locations.]*

L-A completed the weekly audit/inventory of the available CWCs (Contingency Water Containers) and their contents, which keeps a running account of onboard water supplies. *[Updated "cue cards" based on the crew's water callowns are sent up every other week.]*

Mike L-A also performed the regular bi-monthly reboot of the OCA (Orbit Communications Adapter) Comm Router and File Server.

FE-1 Tyurin worked in the DC1 Docking Compartment, activating the thermostat-controlled CRYOGEM-03 cooler in the thermostatic mode, set at +20 degC, with two Module-1 containers of the CRYSTALLIZER payload in the cooler.

In the SM, Mikhail also activated the Russian Universal Bioengineering Thermostat (TBU) incubator, along with its automatic temperature recorder (ART).

Tyurin then downlinked data collected by the ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) experiment.

Sunita Williams serviced GRAVI, the first European experiment in the EMCS (European Modular Cultivation System) on the centrifuge, by terminating the experiment run, taking documentary photography of the upper & lower walls of the cultivation chamber on rotors A & B and stowing the equipment. Suni also exchanged the EMCS video tape, cleaned up the MWA (Maintenance Work Area) site and stowed the equipment. *[GRAVI involves growing lentil seedling roots under various gravity conditions (generated by the centrifuge in the EMCS) on ISS, to determine the amount of acceleration force sufficient to stimulate the direction of root growth. During stimulation, the root curvature is being recorded by time-lapse video during centrifugation to determine the threshold acceleration at which the root responds to the gravity stimulus. This work is relevant to growing sufficient edible*

*crops on future long duration space missions.]*

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-2, FE-1), RED resistive exercise device (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A transferred his, Misha's and Suni's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week). *[Three of the four HRMs are currently malfunctioning, probably due to moisture inside the units. Troubleshooting is underway.]*

At ~6:30am EST, Tyurin linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations.

At ~1:30pm EST, Lopez Alegria and Williams conducted an interactive PAO/TV interview exchange with ABC News and WBZ Radio, Boston, also aired on NASA TV.

Today's CEO (crew earth observations) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Nile River Delta** (*a mapping swath at nadir was requested to document changes in land use. Swamplands are being drained and infilled to provide more agricultural land for the burgeoning population of the delta. Center point 30.8N 31.2E*), **Florida Coastal Everglades** (*shooting a mapping swath along Florida's southernmost coastline, right of track. Ecological changes relate to changes in drainage and chemical effluent from agriculture upstream. Center point 25.3N 80.7W*), and **Caracas, Venezuela** (*nadir pass over this major South American capital city, which lies inland in a high interior valley [~3000 feet] where the climate is cooler. Center point 10.5N 66.9W.*)

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:01am EST [= epoch]*):

Mean altitude -- 338.3 km

Apogee height -- 354.0 km  
Perigee height -- 322.7 km  
Period -- 91.30 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0023327  
Solar Beta Angle -- -43.1 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 135 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 46713

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

01/19/07 -- Progress M-59/24P docking (DC1, 10:00pm)  
01/31/07 -- US EVA-6  
02/04/07 -- US EVA-7  
02/08/07 -- US EVA-8  
02/22/07 or 02/26/07 -- Russian EVA "17.A" (Progress antenna removal)  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (6:20am)  
03/18/07 -- STS-117/13A docking (2:00pm)  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
09/02/07 -- Progress M-61/26P launch  
09/04/07 -- Progress M-61/26P docking (DC1)  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port)  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port)

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/17/07  
**Date:** Wednesday, January 17, 2007 12:46:05 PM  
**Attachments:** [image001.gif](#)

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## **ISS On-Orbit Status 01/17/07**

All ISS systems continue to function nominally, except those noted previously or below. *Progress M-59/24P is ready for launch tonight at 9:12pm EST. (See picture below).*

Adjusted sleep cycle remained at 3:30am EST wakeup, 7:00pm sleeptime (instead of 1:00am-4:30pm).

**Progress M-57/22P undocked last night** on schedule (6:29pm EDT) when the latches were unhooked and a 1-mm separation was completed. The separation burn occurred at 6:32pm, and the vehicle completed the deorbit burn to reenter the earth's atmosphere at 9:31pm. With the completion of the undocking activities, the DC1 was freed for Progress M-59/24P, and the ISS maneuvered (under Russian Segment motion control) to +XVV TEA (+X-axis into the Velocity Vector/Torque Equilibrium Attitude).

After wakeup, FE-2 Williams had the third day of her second seven-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight), performing sleep log and questionnaire entries in the experiment's laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the FE-2's sleep/wake patterns and light exposure, she is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as her patterns of sleep and activity throughout the Expedition.]*

Before breakfast, Sunita Williams also began the second day of her second run with the NASA/JSC experiment NUTRITION, which today called for urine collections. *[Williams collected samples throughout the day for storage in the MELFI (Minus-Eighty Laboratory Freezer for ISS). The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

Later in the day, CDR Lopez-Alegria prepared the NUTRITION hardware for his own session, the third, starting tomorrow.

FE-1 Tyurin serviced the Russian BMP Harmful Impurities Removal System, starting the "bake-out"

cycle to vacuum on absorbent bed #1 of the regenerable dual-channel filtration system. Before sleep time today (5:15pm EDT) the bake-out will be terminated. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

Mike L-A set up an ITCS LTL (Internal Thermal Control System/Low Temperature Loop) coolant jumper connection to the LAB1D6 rack in preparation for the upcoming CDRA (Carbon Dioxide Removal Assembly) activation.

FE-2 Williams deinstalled the IWIS (Internal Wireless Instrumentation System) equipment which measured structural dynamics data during the Progress 22P undocking last night.

Sunita also serviced GRAVI, the first European experiment in the EMCS (European Modular Cultivation System) on the centrifuge, by hydrating cultivation chamber #2 (Group 3) and setting up container #2. *[GRAVI involves growing lentil seedling roots under various gravity conditions (generated by the centrifuge in the EMCS) on ISS, to determine the amount of acceleration force sufficient to stimulate the direction of root growth. During stimulation, the root curvature is being recorded by time-lapse video during centrifugation to determine the threshold acceleration at which the root responds to the gravity stimulus. This work is relevant to growing sufficient edible crops on future long duration space missions.]*

The FE-1 performed Part 2 of his second onboard Russian "PROFILAKTIKA" (MBI-8, "Countermeasures") preventive health maintenance fitness test series, a 2h 30m session. Part 1 was performed on 1/15 on the VELO bike ergometer. *[Today's fitness test was performed on the TVIS treadmill in unmotorized (idle) mode, with free choice of speeds within the range permitted. The test differs from the normal TVIS session by the use of the TEEM-100 gas analyzer (via a mask equipped with a pneumotachometer sensor), measurement of blood lactate level and subjective evaluation of physical exertion levels during the test. The lactate blood samples were taken twice at the end of the session, using the ACCUSPORT analyzer and REFLOTRON-4 accessories. Results were entered on a log sheet. TEEM and ECG (electrocardiograph) data were transferred to the RSE-Med laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP/Moscow.]*

The CDR completed the mandatory 30-min. CBT (computer-based training with video and audio) to refresh his CMO proficiency/rating. *[To maintain proficiency in using HMS (health maintenance systems) hardware including ACLS (advanced cardiac life support) in contingency situations where crew life is at risk, these training sessions are performed once a month to review equipment and procedures via CBT. Besides ACLS, procedures include airway obstruction management, i.e., review of suction device, nasal airway, intubating laryngeal mask airway (ILMA) with endotracheal tube, and cricothyrotomy (incision to re-enable breathing air inflow).]*

The Expedition 14 crew went through the standard 70-minute depress emergency OBT (on-board training) drill, with Russian and US specialists standing by at both control centers in case the crew had questions or comments. A tagup with the ground followed afterwards. The rule is that the emergency egress exercise should be performed by every new station crew once within seven days after departure of the previous crew. *[Some background: Purpose of the drill is to familiarize the station residents with the stowage locations of emergency equipment and the position of valves used in emergency situations, to work through the Russian Segment (RS) deactivation procedures, and to develop crew emergency joint measures. Crewmembers are to verify ISS readiness for emergency response by performing specific actions such as ascertaining the locations of emergency equipment, inspecting all translation paths to the Soyuz CRV and determining any obstructions that would hinder an emergency egress, inspecting all vehicle hatchways and determining if hatchways can be easily cleared in the*

*event of an emergency, reviewing and discussing methods to disconnect air-ducts that run through Russian hatches (without disconnecting any permanent hardware), determining the accessibility of all communications panels and hardware, of specific fireports, deployed and stored instruments and kits (such as CSA-CPs and CCPKs, =crew contamination protection kits), and confirming that specific valves are in the expected configuration.]*

At the HRF1 (Human Research Facility 1) rack, Mike L-A deactivated the MedOps cardiac defibrillator and afterwards conducted the periodic checkout of the defib. (Last time done: 11/17/06). *[This periodic routine task is scheduled as soon as possible from Expedition start and every 60 days thereafter. For the checkout, the defib is connected to the 120V outlet, equipped with its battery (currently #1018) and then allowed to charge, for about five seconds, to a preset energy level (e.g., 100 joules). After the button-triggered discharge, a console indicator signals success or failure of the test. The pacing signal is downlinked via S-band for 2 min. The HRF was afterwards powered down.]*

In the Service Module (SM), Mikhail Tyurin reconfigured the ESA/Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) by changing the position of its AST spectrometer in the SM (90 deg rotation in its place on panel 437). The activity was photo-recorded, with imagery downlinked afterwards. *[ALTCRISS uses the AST spectrometer to monitor space radiation in the Russian segment (RS).]*

Suni conducted the periodic sampling of cabin air for subsequent analysis on the ground by collecting samples with a GSC (Grab Sample Container) at the center of the SM and Lab.

Afterwards, the FE-2 completed air sampling by using the Russian AK-1M adsorber to collect air samples in the SM and FGB and to check for leaked-out Freon.

In addition, Williams deployed two passive FMK (formaldehyde monitoring kit) sampling assemblies in the Lab (below CEVIS) and SM (most forward handrail), to catch any atmospheric formaldehyde on a collector substrate for subsequent analysis on the ground.

CDR Lopez-Alegria completed maintenance on the ventilation fan of the CHeCS rack (LAB1D4) and later cleaned the rack's smoke detectors.

Afterwards, L-A had time set aside to begin with the scheduled activation of the VOA (Volatile Organics Analyzer). Today's job required rotating the CHeCS rack down, before starting AAA (Avionics Air Assembly) cleaning & VOA maintenance, preceded by taking CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen) readings in the affected rack areas. *[If the O<sub>2</sub> percentage was between 15.7% - 24.1%, L-A was Go to proceed. If not, the ground had steps to be taken to ventilate the area. Ground analysis has shown that the secondary seals in QDs (Quick Disconnects) in the Nitrogen/Oxygen systems do not always seal properly, which can result in an increased N<sub>2</sub>/O<sub>2</sub> concentration behind panels & racks with no ventilation. The CHeCS (LAB1D4) is one of these racks.]*

In the FGB, Tyurin performed troubleshooting on the module's IDZ-8 smoke detector of the SPOPT fire warning system.

The FE-1 also conducted the standard suite of noise level measurements in the SM station interior, using the U.S. SLM (sound level meter) for a 50 min acoustic survey to measure background noise after his recent installation of new sound deadening vibration isolators and air ducts with acoustic shields. SLM data were transferred to the MEC (Medical Equipment Computer) for subsequent downlink. *[The outfitting of the SM with noise dampers focused on the VKYu-1 and VKYu-2 crew cabin fans, each one also configured for manual control with a manual fan speed control device (BRUS).]*

Misha performed the periodic status check of the BIO-5 Rasteniya-2 ("Plants-2") Lada-10 experiment as well as photographic imagery of the experiment using the Nikon D1X digital camera with flash and copying all photos from the memory card to the RSK1 laptop for downlink to TsUP/Moscow via the BSR-TM telemetry channel. *[Rasteniya researches growth and development of plants (peas) under spaceflight conditions in the Lada-9 greenhouse. The regular maintenance of the experiment involves monitoring of seedling growth, humidity measurements, moistening of the substrate if necessary, topping off the water tank if ~20-25% of the total amount (4 liters) remains, and photo/video recording.]*

Suni Williams completed today's routine maintenance of the SOZh system in the SM, including ASU toilet facilities systems/replaceables and today also the periodic checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatch openings (8) in the SM, FGB and DC1.

The FE-2 also conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-2, FE-1 for MBI-8), and RED resistive exercise device (CDR, FE-2). *[TVIS running speed limit for Exp-14 is set at 10 mph/16.1 km/h.]*

Afterwards, Sunita transferred her, Misha's and L-A's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week). *[Three of the four HRMs are currently malfunctioning, probably due to moisture inside the units. Troubleshooting is underway.]*

At ~12:50pm EST, Sunita Williams set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, power supply) and at 12:55pm conducted a ham session with participants at Romeo Elementary School, Dunnellon, Florida.

Today's CEO (crew earth observations) photo targets, in the current LVLH attitude no longer limited by flight rule constraints on the use of the Lab nadir/science window, were **Beni River dynamics, Bolivia** *(this morning pass provided good views of the vast Beni River megafan before the daily buildup of cumulus cloud. A mapping pass off nadir about 30 degrees right of track was requested. The radius of this large feature is 450 km. The apex lies against the Andes Mts. This is one of the largest megafans on the planet. Views of river patterns help unravel the dynamics of how these features form).* **Vista Alegre Impact Crater, Brazil** *(nadir pass. Track followed a meandering local river directly towards this 9.5-km-diameter crater. A large lake northeast of the crater is another cue. Third visual cue: crater is occupied by some of the largest fields in the area),* and **Vargeao Dome Impact Crater, Brazil** *(nadir pass. This 12-km-diameter crater lies on the downtrack end of an agricultural area. SRTM (Shuttle Radar Topography) data show a distinct circular depression [caused by the impactor weakening local rocks so that they have eroded more easily]).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 6:38am EST [= epoch]):

Mean altitude -- 338.5 km  
Apogee height -- 354.2 km  
Perigee height -- 322.8 km  
Period -- 91.30 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0022369  
Solar Beta Angle -- -48.8 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 170 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 46697

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

01/17/07 -- Progress M-59/24P launch (9:12pm)  
01/19/07 -- Progress M-59/24P docking (DC1, 10:03pm)  
01/31/07 -- US EVA-6  
02/04/07 -- US EVA-7  
02/08/07 -- US EVA-8  
02/22/07 or 02/26/07 -- Russian EVA "17.A" (Progress antenna removal)  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (6:20am)  
03/18/07 -- STS-117/13A docking (2:00pm)  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
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05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18  
06/07/07 -- Russian EVA-19  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry  
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10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port)

**Progress M-59/24P on its launch pad for tonight's launch in Baikonur, Kazakhstan**



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 01/16/07  
**Date:** Tuesday, January 16, 2007 4:15:30 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/16/07**

All ISS systems continue to function nominally, except those noted previously or below.

Adjusted sleep cycle remained at 3:30am EST wakeup, 7:00pm sleeptime (instead of 1:00am-4:30pm).

After wakeup, FE-2 Williams continued her second seven-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) sleep log and questionnaire entries in the experiment's laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the FE-2's sleep/wake patterns and light exposure, she is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as her patterns of sleep and activity throughout the Expedition.]*

Before breakfast, Sunita Williams also began the first day of her second run with the NASA/JSC experiment NUTRITION, for which she had to forego exercising and food intake for eight hours. *[Suni started the session by collecting blood samples (assisted by CDR Lopez-Alegria), which were first spun in the RC (Refrigerated Centrifuge) and then placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. Williams also started the required 24-hour data collection by securing urine specimen during the day, also stored immediately in MELFI. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status*

*and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R +30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

The crew had their second time with the new NASA-sponsored German/Canadian experiment TRAC (Test of Reaction & Adaptation Capabilities). CDR Lopez-Alegria assembled the hardware in the work area (i.e., laptop, joystick, headphones, time box). Afterwards, the three crewmembers performed their first data take sessions which should verify the robustness of the data collected in the first TRAC run. *[TRAC tests the idea that the decrease in motor skills reported by some astronauts (for example, hand-eye coordination), is due to the brain adapting to being in space. By testing hand/eye coordination of crewmembers, scientists hope to test the theory that while the brain is adapting its sensory-motor functions to space it is unable to fully provide the resources necessary to perform normal manual skills, i. e., the data will be used to show that adaptation to zero-G draws on resources normally used for computational tasks, for example. Crewmembers test their hand-eye coordination prior to the mission, while on orbit and then again when they have returned to Earth. The tests are conducted in seven sessions occurring in one-week intervals toward the end of the Increment. TRAC hardware includes a laptop mounted to a table and a joystick to control the cursor on the PC screen. Also used are audio headphones and a reaction time box to respond to audio and visual stimuli. For the test the crewmember is sitting on the floor of the Lab module, with legs restrained and the work table on the legs.]*

CDR Lopez-Alegria conducted “Week 17” sampling of potable water for chemical and microbial analysis from the SVO-ZV tap and the SRV-K warm tap, the latter after preliminary heating of the water (two heating cycles) and flushing. *[Mike collected a total of six water samples from two ports for today’s water collection activity. Two samples are flush samples to flush the lines, two are micro in-flight samples for processing onboard, and two are chemical post-flight samples for return on 13A. Sample analysis included subsequent processing of water samples in the MWAK (microbial water analysis kit) for inflight coliform bacteria (Escherichia coli) detection, after about 6 hours. Results of the on-board processing will be available after a two-day incubation period, in case of the MWAK after 4-6 days of incubation.]*

Continuing the effort to alleviate noise in the Service Module (SM), FE-1 Tyurin

today assembled two newly-delivered muffler boxes and installed them on the SM VV2RO fan's inlet and outlet.

Lopez-Alegria performed the periodic CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance/checkout on the prime (#1044) and backup (#1051) unit. *[L-A changed out the prime unit's battery, then zero-calibrated both instruments. Following zero calibration, the backup unit was stowed, while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

Suni Williams completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Mike L-A conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Mikhail Tyurin used the Matryoshka-R Bubble Dosimeter panel's computer to acquire radiation readings of the four detectors retrieved from their exposure locations. Afterwards, the Bubble Dosimeter panel was deactivated again. *[The Dosimeter panel is attached with Velcro at its SM work site (near the RBS 10/3 power outlet) and equipped with a fresh MMC memory card. Of eight Bubble dosimeter detectors supplied, only four are used in the first sessions. The complex Matryoshka payload suite is designed for sophisticated radiation studies. The payload collects radiation measurements every 15 minutes of each hour around the clock. Note: Matryoshka is the name for the traditional Russian set of nested dolls.]*

The FE-2 installed the IWIS (Internal Wireless Instrumentation System) equipment for measuring structural dynamics data during tonight's Progress 22P undocking and Progress 24P docking on Friday, 1/19. *[Suni set up the Lab and Node RSUs (Remote Sensor Units) to record data, as she will do on Friday.]*

Williams also terminated GRAVI, the first European experiment in the EMCS (European Modular Cultivation System) after its 30 hrs run. Suni then took photography of the upper and lower wall of the cultivation chambers on centrifuge rotors A & B and changed out the EMCS video tape. The ELC3 laptop was then powered down. *[GRAVI involves growing lentil seedling roots under various gravity conditions (generated by the centrifuge in the EMCS) on ISS, to determine the amount of acceleration force sufficient to stimulate the direction of root growth. During stimulation, the root curvature is being recorded by time-lapse video during*

*centrifugation to determine the threshold acceleration at which the root responds to the gravity stimulus. This work is relevant to growing sufficient edible crops on future long duration space missions.]*

L-A had some time scheduled to prepare for the VOA OMI (Volatile Organics Analyzer/On-orbit Maintenance Item) tomorrow (1/17) and talk to the specialists, if needed.

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exercise device (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1). *[TVIS running speed limit for Exp-14 is set at 10 mph/16.1 km/h.]*

Afterwards, L-A transferred his, Misha's and Suni's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week). *[Three of the four HRMs are currently malfunctioning, probably due to moisture inside the units. Troubleshooting is underway.]*

At ~12:25pm EST, Sunita Williams set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, power supply) and at 12:30pm conducted a ham session with participants of Northlawn and St. Anthony schools in Streator, Illinois, a small city of 14,000 located approximately 90 miles southwest of Chicago.

**Progress M-57/22P undocking from DC1 will be tonight at 6:25pm EST.**

No CEO (Crew Earth Observation) targets uplinked today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
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**ISS Orbit** *(as of this morning, 6:18am EST [= epoch]):*

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Perigee height -- 322.9 km

Period -- 91.31 min.

Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0023485  
Solar Beta Angle -- -52.9 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 86 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 46681

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02/04/07 -- US EVA-7  
02/08/07 -- US EVA-8  
02/22/07 or 02/26/07 -- Russian EVA "17.A" (Progress antenna removal)  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (6:20am)  
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04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
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04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18 **(added)**  
06/07/07 -- Russian EVA-19 **(added)**  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation **(added)**  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry **(added)**  
09/02/07 -- Progress M-61/26P launch **(added)**  
09/04/07 -- Progress M-61/26P docking (DC1) **(added)**  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch **(added)**  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port) **(added)**  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) **(added)**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/15/07  
**Date:** Monday, January 15, 2007 12:48:31 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/15/07**

All ISS systems continue to function nominally, except those noted previously or below. *Martin Luther King Jr. Birthday. Underway: Week 17 of Increment 14.*

Adjusted sleep cycle remained at 3:30am EST wakeup, 7:00pm sleeptime (instead of 1:00am-4:30pm).

After wakeup, FE-2 Williams started her second seven-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) sleep log and questionnaire entries in the experiment's laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the FE-2's sleep/wake patterns and light exposure, she is wearing a special Actiwatch device which measures the light levels encountered by the FE-2 as well as her patterns of sleep and activity throughout the Expedition.]*

In preparation for Progress M-59/24P docking on Friday (1/19, 10:03pm EST), CDR Lopez-Alegria and FE-1 Tyurin completed the standard three-hour training course with the TORU teleoperator system, which provides a manual backup mode to the Progress' KURS automated rendezvous radar system. Afterwards, L-A and Mikhail tagged up with TORU specialists at TsUP/Moscow via S-band audio. *[The drill included procedure review, rendezvous, docking data and rendezvous math modeling data review, fly-around, final approach, docking and off-nominal situations (e.g., video or comm loss). The TORU teleoperator control system lets an SM-based crewmember perform the approach and docking of automated Progress vehicles in case of KURS failure. Receiving a video image of the approaching ISS, as seen from a Progress-mounted docking television camera ("Klest"), on a color monitor ("Simvol-Ts", i.e. "symbol center") which also displays an overlay of rendezvous data from the onboard digital computer, Tyurin would steer the Progress to mechanical contact by means of two hand controllers, one for rotation (RUO), the other for translation (RUD), on adjustable armrests. The controller-generated commands are transmitted from the SM's TORU control panel to the*

*Progress via VHF radio. In addition to the Simvol-Ts color monitor, range, range rate (approach velocity) and relative angular position data are displayed on the "Klest-M" video monitor (VKU) which starts picking up signals from Progress when it is still approximately 7 km away. TORU is monitored in real time from TsUP over Russian ground sites (RGS) and via Ku-band from Houston, but its control can not be taken over from the ground.]*

The FE-1 unstowed and installed the Russian Universal Bioengineering Thermostat (TBU) incubator in the Service Module (SM), along with its automatic temperature recorder (ART).

Afterwards, Tyurin relocated the thermostat-controlled CRYOGEM-03 cooler from the FGB to the DC1 Docking Compartment, installed it behind panel 403 and connected it to the RBS-A16 power outlet. *[CRYOGEM-03M will be activated on 1/18 in the thermostatic mode, set at +20 degC, followed by installation of two Module-1 containers of the CRYSTALLIZER payload in the cooler.]*

FE-2 Williams set up GRAVI, the first European experiment in the EMCS (European Modular Cultivation System), first configuring the MWA (Maintenance Work Area) for GRAVI, then taking imagery of the MWA and GRAVI culture chambers, hydrating 16 cultivation chamber (8 per EMCS rotor) and installing them on the GRAVI Handler. After changing out the EMCS videotape, Suni began the first experiment run with eight ECs (Experiment Containers) installed on EMCS centrifuge A&B. *[EMCS, delivered on ULF1.1, is a combination centrifuge/growth chamber that allows plant growth experiments to be carried out in controlled partial and microgravity conditions. GRAVI, an adjunct to TROPI, will grow lentil seedling roots under various gravity conditions (from 1/10th - 1/100th of Earth gravity, generated by the EMCS centrifuge) to determine the amount of acceleration force sufficient to stimulate the direction of root growth. During stimulation the gravitropic response (root curvature) will be recorded by time-lapse video during centrifugation to determine the threshold acceleration at which the root responds to the gravity stimulus. This work is relevant to growing sufficient edible crops on future long duration space missions. Gravi is the first ISS experiment to investigate the graviperception and gravisensing abilities of lentil roots. Previous experiments have been flown on the Space Shuttle starting with the Spacelab-D1 mission in 1985, and including STS-107, the tragic last mission of the Columbia.]*

The FE-1 completed a 2h 30m session of Part 1 of his third onboard "Profilaktika" (MBI-8, "Countermeasures") preventive health maintenance fitness test series, starting with the VELO stationary cycle ergometer. *[Misha will do an additional part of the test tomorrow (1/16) on the TVIS treadmill. Test procedure for MBI-8 is identical to the Russian MO-5 assessment, but in addition to the nominal procedure it uses the TEEM-100M gas analyzer with breathing mask, a blood*

*lactate test with the ACCUSPORT analyzer and REFLOTRON-4 accessories, and a subjective evaluation of physical exertion levels during the test (using the Borg Perceived Exertion Scale, viz., 10 steps from very light over hard and very hard to maximum). Results are entered on a log sheet. TEEM and ECG (electrocardiograph) data are transferred to the Laptop 3, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]*

After Sunita Williams prepared the auditory checkup equipment, each crewmember took the periodic on-orbit hearing assessment (O-OHA) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC (Medical Equipment Computer) laptop application. It was L-A's fourth, Misha's third, and Suni's second session. *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month.]*

The FE-2 also performed the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Suni completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The FE-2 also conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Later, Williams unstowed and set up the hardware for the urine collection part of her next session with the NUTRITION experiment. *[The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts, collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore,*

*additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI/Minus Eighty Degree Celsius Laboratory Freezer for ISS), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

Mike L-A conducted the periodic IMS (Inventory Management System) food audit, to determine the number of unopened food containers/kits, in support of manifesting decisions for future resupply flights. *[The IMS updating is done with the BCR (Bar Code Reader) in batch mode, including recording of current physical locations. Unopened food containers are indicated by a green strap around the package.]*

L-A also did the periodic (once per month) routine inspection of the RED (Resistive Exercise Device) with canister cords, squat harness components, and accessory straps, and the Flexpack canister bolts for re-tightening if required.

As part of ongoing Lab IATCS (Internal Active Thermal Control System) coolant remediation efforts, the CDR installed a Nickel Removal Assembly (NiRA) filter to remove problematic nickel from the IATCS coolant in the LTL & MTL (Low Temperature & Moderate Temperature Loops). *[Prior to installing NiRA, L-A reconfigured the LAB105 RFCA (Rack Flow Control Assembly) at the LAB105 location from the MTL to the LTL, then took an IATCS coolant sample for return to ground. NiRA-1 will stay installed until five days before 13A docking. NiRA-2 will be installed in the 13A stage.]*

In preparation for tomorrow's (1/16, 6:25pm) Progress 22 undocking, FE-1 Tyurin activated the cargo ship and dismantled the air duct in the hatchway of the SM PrK aft dock.

During subsequent removal of the threaded quick-disconnect (QD) screw clamps of the SM docking & internal transfer system (SSVP), which had rigidized the mating surfaces, followed by closure of the hatches between 22P and transfer tunnel (~4:10pm EST), and the standard one-hour vestibule leak check to verify hermeticity, the ground has restricted thruster firings by the Russian segment (RS), during the time interval of 3:40pm-6:09pm.

Later, at ~4:30pm, Misha will downlink the video footage taken of the Progress/PrK docking interface before hatch closing, via Ku- and S-band, for ground inspection.

Working off his “time permitting” discretionary task list, the FE-1 performed the periodic status check on the long-term BIO-5 Rasteniya-2 (“Plants-2”) micro-G growth payload, including the newly planted pea seeds in the Lada-10 greenhouse.

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR), RED resistive exercise device (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1, for today’s MBI-8). *[TVIS running speed limit for Exp-14 is set at 10 mph/16.1 km/h.]*

Afterwards, Suni transferred her, Misha’s and L-A’ exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

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03/16/07 -- STS-117/13A launch -- S3/S4 trusses (6:20am) **(time added)**  
03/18/07 -- STS-117/13A docking (2:00pm) **(time added)**  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18 **(added)**  
06/07/07 -- Russian EVA-19 **(added)**  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation **(added)**  
09/01/07 -- Progress M-60/25P undocking (DC1) & reentry **(added)**  
09/02/07 -- Progress M-61/26P launch **(added)**  
09/04/07 -- Progress M-61/26P docking (DC1) **(added)**  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch **(added)**  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port) **(added)**  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) **(added)**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/14/07  
**Date:** Sunday, January 14, 2007 11:56:23 AM  
**Attachments:**

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### **ISS On-Orbit Status 01/14/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for the Expedition 14 crew of CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams. Ahead: Week 17 of Increment 14.*

Adjusted sleep cycle remains at wakeup 3:30am EST, sleeptime 7:00pm (instead of 1:00am-4:30pm).

CDR Lopez-Alegria completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables, the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

FE-2 Williams serviced the EMCS (European Modular Cultivation System) by powering up the ELC3 (EXPRESS Rack 3 laptop) computer and opening the EMCS gas valves to support ground-commanded EMCS operation. *[EMCS, delivered on ULF1.1, is a combination centrifuge/growth chamber that allows plant growth experiments to be carried out in controlled partial and microgravity conditions.]*

Working off his voluntary "time permitting" task list, Tyurin performed another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the SONY PD-150P camcorder, to provide lacking information about the size and current situation on plankton fields near continental western offshore regions as well as about the position and shape of cloud cover irregularities over oceanic high production areas. *[Target areas were the Red Sea in the Indian Ocean, and Newfoundland Island, the St. Lawrence Gulf, and the coastal zones of Portugal and Africa in the Atlantic.]*

Also from the task list, the FE-1 performed the periodic status check on the long-

term BIO-5 Rasteniya-2 ("Plants-2") micro-G growth payload, including the newly planted pea seeds in the Lada-10 greenhouse.

The crew completed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR), TVIS treadmill (FE-1, FE-2), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Suni Williams had her weekly PFC (Private Family Conferences) at ~11:07am EST. Misha Tyurin had his PFC yesterday.

No CEO (Crew Earth Observations) photo targets uplinked today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:22am EST [= epoch]*):

Mean altitude -- 338.8 km

Apogee height -- 354.6 km

Perigee height -- 323.0 km

Period -- 91.31 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0023525

Solar Beta Angle -- -62.1 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 135 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46650

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

01/16/07 -- Progress M-57/22P undocking (DC1, 6:25pm) & reentry

01/17/07 -- Progress M-59/24P launch (9:12pm)

01/19/07 -- Progress M-59/24P docking (DC1, 10:03pm) **(time changed)**

01/31/07 -- US EVA-6

02/04/07 -- US EVA-7

02/08/07 -- US EVA-8

02/22/07 or 02/26/07 -- Russian EVA "17.1" (Progress antenna removal)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses (6:20am) **(time added)**

03/18/07 -- STS-117/13A docking (2:00pm) **(time added)**

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
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04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
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05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
06/01/07 -- Russian EVA-18 **(added)**  
06/07/07 -- Russian EVA-19 **(added)**  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
08/02/07 -- PMA-3 relocation **(added)**  
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09/04/07 -- Progress M-61/26P docking (DC1) **(added)**  
09/07/07 -- STS-120/10A -- Node 2  
10/02/07 -- Soyuz TMA-11/15S launch **(added)**  
10/04/07 -- Soyuz TMA-11/15S docking (SM aft port) **(added)**  
10/13/07 -- Soyuz TMA-10/14S undocking (FGB nadir port) **(added)**

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 01/13/07  
**Date:** Saturday, January 13, 2007 1:00:22 PM  
**Attachments:**

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**FOR OFFICIAL USE ONLY**

**ISS On-Orbit Status 01/13/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams.*

In preparation for the upcoming Progress activities, the crew's sleep cycle was adjusted today by 2.5 hrs, to wakeup at 3:30am EST; sleep 7:00pm (instead of 1:00am-4:30pm).

The crew conducted the regular weekly three-hour task of thorough station cleaning. *["Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with a standard cleaning solution (not "Fungistat" disinfectant as erroneously stated in previous Saturday reports); also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of the house cleaning, FE-1 Tyurin performed preventive maintenance cleaning on the FGB ventilation system.

Misha also completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables.

FE-2 Sunita Williams yesterday successfully completed the first official onboard training session using ROBoT. Today, Suni disconnected the SSCs (Station Support Computers) from the simulator hardware and moved ROBoT from the Lab to a Node rack for temporary stowage. *[ROBoT uses DOUG (Dynamic Operations*

*Ubiquitous Graphics) software, a hand controller and two laptops (one for graphics, one for the simulation) for on-orbit training of MSS (Mobile Service System) and SSRMS (Space Station Remote Manipulator System) operations. Yesterday's SSRMS training was declared complete and beneficial by the Training representative and FE-2, who each provided recommendations for improvements in future sessions. The script included arm maneuvers associated with an EVA crew member on the SSRMS. The maneuvers, all of which included EVA GCA (Ground Control Assist) calls, were to APFR (Articulating Portable Foot Restraint) install, APFR ingress, ESP2 (External Stowage Platform 2) worksite and Truss worksite. ]*

For today's voluntary "Saturday Science" session, CDR Lopez-Alegria conducted an Ultrasound (U/S) "Lite" checkout (not the full U/S checkout for which he had received training). *[After powering up the medical/diagnostic Ultrasound equipment, the ground received a live downlink of the ultrasound video to verify that the system had booted and was putting out a video signal. The U/S was to run for a period of time and then L-A was scheduled later in the day to turn it off.]*

For EPO (Educational Payload Operations), L-A and Suni also conducted a demonstration of the ECLSS (Environmental Control & Life Support System), video taping the session while discussing how ECLSS provides a habitable environment on the ISS. *[The video is intended for students in grades 5 - 12.]*

Lopez-Alegria and Williams completed another filling out of the regular weekly FFQ (Food Frequency Questionnaire) on the MEC (Medical Equipment Computer), his fifteenth and Suni's fourth, which keeps a personalized log of their nutritional intake over time on special MEC software. *[The FFQ, updated with the new food brought up on 12A.1, records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. IBMP/ Moscow (Institute of Biomedical Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value of the crew's food intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]*

At ~8:10am EST, the crew had their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Working off his voluntary "time permitting" task list, the FE-1 performed a session of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with the SIGMA 300-800 focal length lens to take pictures of natural environment targets. *[Specific target areas were ice conditions on the northern*

*coast of the Caspian Sea from the shores to mid-northern portion, the coastal strip of the southern portion of the Aral Sea, the Eastern (Russian) coast of the Sea of Azov in exact nadir, and the Northern slope of the main Caucasus Ridge (Russian side) to study avalanches.]*

Also from the task list, the FE-1 used the Nikon D1X (SIGMA 300-800mm telephoto lens) to make observations and take aerial KPT-3 photography for Russia's Environmental Safety Agency (ECON) of the environment of the Bermudas and the Sargasso Sea water surface. *[KPT-3 photography is a frequent earth observing experiment for ECON.]*

The crew performed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A copied his, Suni's and Misha's exercise data files to the MEC for downlink.

### **Weekly Science Update** (*Expedition Fourteen -- 16<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):* ALTEINO is functioning nominally.

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BASE:* Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA):* Complete.

*CBOSS (Cellular Biotechnology Support Systems):* Complete.

*CFE (Capillary Flow Experiment):* Complete.

*CULT (Cultural Factors Questionnaire):* Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test):* Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* In progress.

*ETD (Eye Tracking Device):* Complete for Thomas Reiter.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology):* Planned

*GRAVI (Threshold Acceleration for Gravisensing):* Experiment execution is currently scheduled between 01/15 and 01/20.

*IMMUNO (Saliva Sampling):* Complete.

*LEUKIN:* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs". Removal of passive dosimeters from the MATRYOSHKA Phantom was performed on 12/07 and returned on STS-12A.1.

*NOA (Nitric Oxide Analyzer):* Complete.

*Nutrition:* Planned.

*PK-3 (Plasma Crystal 3):* In progress.

*PMDIS (Perceptual Motor Deficits in Space):* Planned.

*POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G):* Complete.

*RC (Refrigerated Centrifuge):* Planned.

*RS (Renal Stone):* The Renal Stone team thanked the CDR for completing this past Renal Stone session. This session was stand-alone from Nutrition to ensure that his "mid-point" collection falls within the same flight day range as previous subjects for statistical purposes. The PI team has confirmed they have received the complete BCR (Bar Code Reader) data and all crew notes L-A made for his activities.

*SAMPLE:* Complete.

*SEM (Space Experiment Module):* Complete.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight):* Planned.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):* In progress.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft):* Planned.

*TRAC (Test of Reaction & Adaptation Capabilities):* Next execution is scheduled on 01/16 for each crew member

*TROPI (Study of Novel Sensory Mechanism in Root Phototropism):* All TROPI data runs are now complete.

*YING (Yeast in No Gravity):* Complete.

*CEO (Crew Earth Observations):* Through 1/4/07 the ground has received a total of 2,886 Expedition 14 CEO images for review and cataloging. Since the STS-116 mission, three CEO images have been published on NASA/GSFC's Earth Observatory website: (a) a detailed view of Geneva, Switzerland in early November; (b) a high-resolution view of Dyess Air Force Base in Abilene, Texas, also from November; and (c) a striking image of Gibraltar Bay in the western Mediterranean Sea acquired in late October. This weekend a nice, glint-enhanced oblique view of the New Orleans area in November is also scheduled for posting.

Today's CEO photo targets, in the current LVLH attitude no longer limited by flight rule constraints on the use of the Lab nadir/science window, were **Hyderabad, India** (looking left of track for this urban region [8 million population]. The gray cityscape is more visible than some because of better contrast against the greener surrounding countryside. Center point 17.4N 78.5E), **Oasis Impact Crater, Libya** (this crater is 18 km in diameter and is dated as less than 120 million years old. Looking just left of nadir. The visual cues are black hills just north. Center point 24.6N 24.4E), and **Saharan dust** (Dynamic event. The Chad basin, Africa's largest dust source, is active again. Major dust plumes are rising from the desert floor for hundreds of km north of Lake Chad, which is your primary visual cue. Looking obliquely left of track towards the Tibesti Mts. for ~2 minutes).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 6:56am EST [= epoch]):

Mean altitude -- 338.9 km  
Apogee height -- 354.7 km  
Perigee height -- 323.1 km  
Period -- 91.31 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0023569  
Solar Beta Angle -- -68.2 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 98 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 46634

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

01/16/07 -- Progress M-57/22P undocking (DC1, 6:25pm) & reentry (**date changed; time added**)  
01/17/07 -- Progress M-59/24P launch (9:12pm) (**date changed; time added**)  
01/19/07 -- Progress M-59/24P docking (DC1, 10:00pm) (**date changed; time added**)  
01/31/07 -- US EVA-6  
02/04/07 -- US EVA-7  
02/08/07 -- US EVA-8  
02/26/07 -- Russian EVA "17.1" (Progress antenna removal)  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses  
03/18/07 -- STS-117/13A docking  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 01/12/07  
**Date:** Friday, January 12, 2007 1:03:26 PM  
**Attachments:** [image002.gif](#)

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### **ISS On-Orbit Status 01/12/07**

All ISS systems continue to function nominally, except those noted previously or below. *Today 100 years ago (by today's Gregorian Calendar, in use in Russia, before: Dec. 30, 1906) Sergei Pavlovich Korolev, the Soviet space program's Chief Designer, was born in the Ukrainian city of Shitomir. Without him, a lot of us would be doing something totally different today and of much less use to humankind. Bolshoe spasibo, SP! (Picture see below).*

In preparation for Progress M-59/24P docking next week (1/19), CDR Lopez-Alegria and FE-1 Tyurin conducted the standard 40-min. vehicle-to-vehicle test of the TORU between the SM and the docked Progress-58/23P, closely monitored by ground personnel during DO3 (Daily Orbit 3). Progress thrusters (DPO) were inhibited and not involved. *[TORU lets a Service Module (SM)-based crewmember perform the approach and docking of automated Progress vehicles in case of KURS failure.]*

To continue preparations for Progress M-57/22P undocking next Wednesday (1/16), the crew proceeded with the dismantling and removal of electronic equipment from the cargo ship, to be recycled. TsUP/Moscow, via RGS (Russian ground site), was then ready to initiate charging of the Progress' primary and reserve batteries, as required. *[After deactivating the US-21 matching unit and SKV-1 dehumidifier and disconnecting the cables of the BITS 2-12 onboard telemetry measurement system, with its VD-SU monitoring mode turned off, Tyurin unbolted and removed the Progress' US-21 in its container box. In addition, the FE-1 took out the cargo ship's LKT local temperature sensor commutator (TA251MB) of the BITS2-12 and its PZU-1M ROM (read-only memory) unit. BITS and SKV-1 were later reactivated. The US-21 matching unit, with its associated commutator gear, provides the electronic interface between the Service Module (SM) and the Progress for SM computer control of Progress propulsion. When a Progress is undocked and jettisoned, the valuable electronics are retained, to be recycled on a future vehicle.]*

Tyurin and Williams also continued stowing excess hardware and trash in 22P for disposal, while keeping track of the moves in the IMS (Inventory Management System) database update file using the wireless BCR (Bar Code Reader).

Next, Tyurin and Lopez-Alegria installed the Progress docking mechanism (StM) preparatory to undocking.

In the Node "ceiling", L-A and Sunita removed the hardplate of the RED (Resistive Exercise Device) and opened the hatch to the Z1 cargo dome. After retrieving selected stowed equipment including CBM CPAs (Common Berthing Mechanism Controller Panel Assemblies) from the volume and stowing other gear, L-A inspected and cleaned the hatch seal before closing the hatch. The RED hardplate was subsequently re-installed. *[The Increment 13 inspection discovered that the seals were covered in a fine dust that could not be removed with the vacuum cleaner. Today's hatch seal inspection procedure has been updated with a new hatch seal cleaning procedure which should help remove fine dust if it is seen again.]*

The CDR performed the periodic atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[CSA-CP measurements were gathered with the new 12A.1 units #1044 (prime) & #1051 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1009 for CO<sub>2</sub> in SM and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1044, and returned to their regular locations.]*

Meanwhile, FE-2 Williams reconfigured the ITCS RFCA (Internal Thermal Control System/Rack Flow Control Assembly) in the Lab by switching it from MTL (Moderate Temperature Loop) to LTL (Low Temperature Loop) operation, as required for the subsequent installation of a nickel filter device. After then taking ITCS water samples, Suni installed the NiRA (Nickel Removal Assembly). *[The NiRA-1 filter at the Z-panel needs to be installed for at least 30 days and will later be removed prior to 13A.]*

Tyurin gathered and packed various ventilation system components in two bags and stowed them in the DC1 and FGB modules.

Williams performed the regular bi-monthly reboot of the OCA (Orbit

Communications Adapter) Comm Router and File Server.

Suni also conducted the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

At ~4:40am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~6:10am EST, Tyurin linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Today's issues included IMS information on the stowage location of the DS-7A smoke detectors dismantled on 12/28, IMS updates performed by the ground, actual contents of a bag labeled "old EVA and Orlan equipment" but listed in the IMS as containing 7 dust filters, etc.]*

At ~2:10pm, the crewmembers are scheduled for their regular weekly tagup with the Lead Flight Director at JSC/MCC-H.

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVUIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-1), RED resistive exercise device (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1). *[TVIS running speed limit for Exp-14 is set at 10 mph/16.1 km/h.]*

Afterwards, L-A transferred his, Misha's and Suni's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

For the voluntary "Saturday Science" program tomorrow, the ground has proposed to L-A an EPO demo consisting of the ECLSS systems and an Ultrasound Lite activity that was originally planned for the 1/6/07 Saturday Science. It is Mike's choice to "perform none, one or both of these activities" on 1/13.

*ROBoT Update:* FE-2 Williams was unable yesterday to complete her ROBoT session due to the time needed to get the two A31p laptops to communicate with each other. The crew and ROBoT specialists are assessing alternate opportunities to complete this training session.

Today's CEO (crew earth observations) photo targets, in the current LVLH attitude no longer limited by flight rule constraints on the use of the Lab nadir/science window, were **Lahore, Pakistan** (*nadir pass over Pakistan's second city and the fifth largest in Asia. The airport, major canals and highways are the best visual cues for this hard-to-see city. Population is expected to reach 10 million in the next year*), **Delhi, India** (*India's capital city has 13.8 million inhabitants and a diameter of ~30 miles. It lies on the Yamuna River, one of the main visual cues. The airport to the southwest of the city center is another cue*), and **Lake Chad, Chad** (*Dynamic event. In the late 1960s water levels in Lake Chad dropped. This low phase of the lake appears to be changing. No images have been obtained for almost a year. Looking nadir and left*).

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Eccentricity -- 0.0023519

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04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

*Sergei Pavlovich Korolev (1907-1966)*



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/11/07  
**Date:** Thursday, January 11, 2007 12:03:59 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/11/07**

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, CDR Lopez-Alegria, FE-1 Tyurin and FE-2 Williams performed the Russian biomedical routine assessments of Calf Volume Measurement (PZEh-MO-7) and Body Mass Measurement (PZEh-MO-8), second time for Suni, eighth time for L-A and Misha, using the IM mass measurement device, later breaking it down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

Mikhail Tyurin also took the periodic (generally monthly) health test with the cardiological experiment PZEh MO-1 "Study of the Bioelectric Activity of the Heart at Rest" on the TVIS (Treadmill with Vibration Isolation System), assisted by the CDR. *[During the 30-min. test, the crew tagged up with ground specialists on Russian ground site (RGS) passes on Daily Orbit 4 (~4:30am EST) via VHF and downlinked data from the Gamma-1M ECG (electrocardiograph) for about 5-6 minutes.]*

Later the FE-1 performed a major 2h 30m-hour IFM (in-flight maintenance) in the FGB: removing one of the module's six 800A storage batteries (#5) and replacing it with a spare Blok 800A. The removed unit was prepared for disposal on Progress M-57/22P. *[The ZRU charge/discharge unit #5 was deactivated by TsUP/Moscow*

*beforehand and later reactivated. The new battery #5 is currently being conditioned in Cycle mode. This restores the full set of six FGB batteries to operation.]*

Lopez-Alegria and Tyurin again had time reserved for stowing trash and discarded equipment on 22P, with updating of the IMS (Inventory Management System).

In the Lab, Sunita Williams finished setting up the ROBoT simulator, started yesterday, configuring and powering up its A31p laptops which she then used to perform a robotics proficiency training with the new ROBoT software transferred from CDs. After the simulation session, the A31p's were reconfigured for their normal SSC (Station Support Network) functions. *[ROBoT uses DOUG (Dynamic Operations Ubiquitous Graphics) software, a hand controller and two laptops (one for graphics, one for the simulation) for on-orbit training of MSS (Mobile Service System) and SSRMS (Space Station Remote Manipulator System) operations. Today's SSRMS simulated maneuvering session was divided into two blocks to maximize comm time.]*

L-A completed the weekly audit/inventory of the available CWCs (Contingency Water Containers) and their contents, which keeps a running account of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

Misha Tyurin worked on the Matryoshka-R payload, initializing its "Bubble" dosimeter via its computer, to acquire radiation readings from its four detectors. *[The dosimeter panel is attached with Velcro at its SM work site (near the RBS 10/3 power outlet) and equipped with a fresh MMC memory card. Of eight Bubble dosimeter detectors supplied, only four are used in the first sessions. The complex Matryoshka payload suite is designed for sophisticated radiation studies.]*

Mike L-A prepared stowage locations for the planned relocation of equipment currently stowed in the Z1 cargo dome in the Node "ceiling". *[Today's task was Part 1 of the scheduled Z1 Stowage Swap, gathering the spares from various locations in the US segment for long term stowage in Z1 tomorrow. Tomorrow, L-A will attempt to stow as many of the staged spares as possible inside the Z1 pressure module.]*

Suni Williams worked on the RED (Resistive Exercise Device), replacing its pulley cables (done after every 53,515 cycles, based on life cycle testing results & safety controls), and then completed the on-orbit load calibration of its Flexpac canisters as required after cable replacements. (Last time done: 10/23/06). *[The calibration of the Schwinn RED cans re-establishes the relationship of specific load settings with a specific number of pulls per setting, followed by recording of the load values measured with a calibration tool and steel handles from the on-orbit calibration kit.]*

The FE1 performed the periodic status check of the BIO-5 Rasteniya-2 ("Plants-2") Lada-10 experiment as well as photographic imagery of the experiment using the Nikon D1X digital camera with flash and copying all photos from the memory card to the RSK1 laptop for downlink to TsUP via the BSR-TM telemetry channel.

*[Rasteniya researches growth and development of plants (peas) under spaceflight conditions in the Lada-9 greenhouse. The regular maintenance of the experiment involves monitoring of seedling growth, humidity measurements, moistening of the substrate if necessary, topping off the water tank if ~20-25% of the total amount (4 liters) remains, and photo/video recording.]*

Williams completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

The FE-2 also conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew performed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copied her, L-A's and Misha's exercise data files to the MEC (Medical Equipment Computer) for downlink.

Today's CEO (crew earth observations) photo targets, in the current LVLH attitude no longer limited by flight rule constraints on the use of the Lab nadir/science window, were **Northern Mariana Islands, & Guam** (*looking left and right of track to document tropical coral reefs. Detailed mapping and color data are extracted from the CEO imagery. Center point 17N 145E*), **Chaing Mai, Thailand** (*Thailand's most important northern city has five universities, a population of 700,000, and a booming tourist trade [especially for trips into the surrounding hill country]. Looking just left of track for the city center. Center point 18.8N 99E*), and **Saharan dust, West Africa** (*Dynamic event. A major out blow of dust from the central Sahara is bringing dust offshore of the West African coast. Look obliquely left along the line of the dust front to capture this atmospheric discontinuity, which appears as hazy air to the north, and clear, slightly cloudy air to the south. It is believed this discontinuity has not been imaged by handheld cameras in this part of the world*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:33am EST [= epoch]*):

Mean altitude -- 339.1 km  
Apogee height -- 355.0 km  
Perigee height -- 323.3 km  
Period -- 91.32 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0023618  
Solar Beta Angle -- -72.4 deg (magnitude decreasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 79 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 46603

**Significant Events Ahead** (all dates Eastern and subject to change [*changes are called out*]):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry  
01/17/07 -- Progress M-59/24P launch (9.12pm) **(date changed; time added)**  
01/19/07 -- Progress M-59/24P docking (DC1, 10:03pm) **(date changed; time added)**  
01/31/07 -- US EVA-6 **(new date)**  
02/04/07 -- US EVA-7 **(new date)**  
02/08/07 -- US EVA-8 **(new date)**  
02/26/07 -- Russian EVA "17.1" (Progress antenna removal) **(new date)**  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses  
03/18/07 -- STS-117/13A docking  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
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05/14/07 -- Progress M-60/25P docking (DC1)  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/10/07  
**Date:** Wednesday, January 10, 2007 11:57:02 AM  
**Attachments:**

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### **ISS On-Orbit Status 01/10/07**

All ISS systems continue to function nominally, except those noted previously or below.

After wakeup (1:00am EST), before breakfast & first exercise, CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams completed the regular monthly session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. Afterwards, Tyurin stowed the Urolux hardware. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

Third & final day for CDR Lopez-Alegria's 2<sup>nd</sup> ("mid-term") NASA/JSC kidney stone session, collecting one final urine sample in the morning, finishing his dietary/metabolic log entries and then stowing all equipment. *[This long-range preventive medicine investigation features regular daily ingestion of either potassium citrate or placebo tablets at dinnertime. It is a double blind research study by NASA/JSC, investigating statistically whether potassium citrate is as effective in zero-G in preventing formation of kidney stones as it is on the ground. The experiment requires keeping a metabolic diet log (food & fluid intake), followed by collection of urine samples several times per day during the three-day session, with collections ending today.]*

In the Soyuz TMA-9/13S spacecraft's Orbital Module, FE-1 performed the monthly cleaning of the screen/grid of its BVN fan & air heater assembly, to assure adequate air ventilation.

L-A and Williams had 1.5 hours scheduled to do the periodic thorough inspection of the Emergency Lighting Power Supply (ELPS) units in the U.S. segment. *[There are three ELPS units in the Node, two in the Lab, and one ELPS in the US Airlock.]*

Yesterday's R&R (removal & replacement) of the Russian VB-3 "Velosiped" (VELO) ergometer was not completed nominally. After the installation of the new unit, delivered on Progress M-58/23P, the crew was unable to get its control panel functioning properly. Today's TsUP-supported troubleshooting of the VELO was successful, by retaining the old control panel on the new VB-3.

For stowing the old VB-3 ergometer on Progress M-57, Mikhail Tyurin dismantled and removed the docking mechanism (StM) between 22P and the DC1 Docking Compartment to provide enough clearance. Before 22P undocking next week, the StM will be reinstalled.

Tyurin also disassembled and removed the ventilation unit with an air heater (VN) that he had installed in the 22P's cargo compartment (GrO) on 12/2, and stowed the hardware in the DC1 "Pirs" airlock.

The CDR continued transfer & stowage of discarded hardware in 22P for disposal, along with commensurate IMS (Inventory Management System) updating.

Working on the SM SOZh (Service Module/Environment Control & Life Support System) plumbing system, the FE-1 removed & replaced the gas-liquid mixture filter (FGS) in the powered-down condensate water processor (SRVK-2M). *[The SRVK-2M was subsequently reactivated, and the parts were prepared for disposal on Progress 22. For the filter replacement, the FE-1 also temporarily turned off the SKV air conditioner.]*

FE-2 Williams performed the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

In the SM, Misha readied the newly installed Russian BIO-5 Rasteniya-2 ("Plants-2") experiment, planting its root module with pea seeds, charging the water canister, loading new software and running a hardware test. *[Rasteniya-2 researches growth and development of plants (peas) under spaceflight conditions in the Lada-10 greenhouse. During its operation, the experiment requires regular daily maintenance of the experiment involving monitoring of seedling growth, humidity measurements, moistening of the substrate if necessary, and photo/video recording.]*

Sunita Williams serviced the MELFI (Minus-Eighty Laboratory Freezer for ISS). *[The activity involved replacing desiccant in Dewar 4, conducting a pressure check of the nitrogen (N<sub>2</sub>) cooling medium to ensure it is within acceptable range, inserting -32 degC ICEPACs into a Box Module and stowing them in Dewar 3, covered with desiccant.]*

For tomorrow's ROBoT training activity, the FE-2 relocated the ESA LDM (Long Duration Mission) Astrolab robotic simulator hardware from the Node to the Lab and connected cables for the two hand controllers and the SSC (Station Support Computer) laptop. *[ROBoT uses DOUG (Dynamic Operations Ubiquitous Graphics) software, a hand controller and two laptops (one for graphics, one for the simulation) for on-orbit training of MSS (Mobile Service System) and SSRMS (Space Station Remote Manipulator System) operations. The setup will be concluded tomorrow.]*

Lopez-Alegria and Williams performed the mandatory CHeCS (Crew Health Care Systems) emergency/contingency medical OBT (on-board training) drill, a one-hour U.S. exercise designed to refresh crewmembers' acuity in applying ACLS (Advanced Cardio Life Support) in an emergency. *[Setting up (but not actually operating/manipulating) onboard equipment such as the RSP (Respiratory Support Pack), ALSP (Advanced Life Support Pack), intubation kit, HMS defibrillator, all stowed in the Lab CHeCS rack, and the CMRS (Crew Medical Restraint System), L-A and Suni stepped through the ACLS algorithm manual to resolve a simulated medical emergency onboard ISS. Objectives of the exercise include practicing communication and coordination necessary to perform medical emergency procedures, locating appropriate emergency medical components, and determining each crewmember's individual method of delivering CPR (cardio-pulmonary resuscitation) in zero-G.]*

The FE-1 downloaded system data/log files from the Russian payload server (BSPN) to the ISS Wiener laptop and onto a FlashCard, to be dumped to the ground for analysis on TsUP Go. *[The data transfer, required for periodic analysis of server condition, was preceded by a comm check between the ISS Wiener laptop and the BSPN.]*

Mikhail Tyurin also completed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown.]*

In the U.S. Airlock, Suni Williams successfully completed a one-time modification of the UIA (Umbilical Interface Assembly) waste water port to allow direct EMU (Extravehicular Mobility Unit) water dumping.

Tyurin completed today's routine maintenance of the SOZh system in the SM, including ASU toilet facilities systems/replaceables and today also the periodic checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatch openings (8) in the SM, FGB and DC1.

The FE-1 also conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The oxygen (O<sub>2</sub>) supply remaining in 22P (5-8 mmHg last night) is being used up to refresh the ISS cabin atmosphere. The Elektron O<sub>2</sub> generator continues to operate nominally on 24 amps (current [amperage] determines performance, i.e., output).

The crew completed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR, FE-2), TVIS treadmill (CDR, FE-1), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copied her, L-A's and Misha's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~11:40am EST, Mike Lopez-Alegria and Sunita Williams conducted a televised interactive PAO exchange with the U.S. Embassies in Madrid/Spain and New Delhi/India. *[In Madrid (for L-A, of Spanish background) U.S. Ambassador Eduardo Aquirre attended the event with media and school children, and in New Delhi (for Suni, of Indian background) U.S. Ambassador David C. Mulford was accompanied by Rakesh Sharma, the first Indian in space (Mir Space Station).]*

Today's CEO (crew earth observations) photo targets, in the current LVLH attitude no longer limited by flight rule constraints on the use of the Lab nadir/science window, were **Shanghai, China** (*Shanghai lies on the south shore of the Chang Jiang [Yangtze River] estuary. Looking nadir and left toward the river. The urban margin of this rapidly growing megacity was particularly requested. The city's population was estimated at around 17 million at the end of 2003, including 3 million*

migrant workers. Other estimates of the uncounted migrant population suggest more than 4 million). Of additional interest are oblique views (with horizons, coasts, etc.) around the region to document likely smog haze generated by winter home-heating fires), **Mississippi Delta Region** (almost nadir pass over New Orleans. Mapping swath requested, especially along coasts and waterways, to show post-hurricane recovery of various kinds), and **Yellowstone National Park, Wyoming** (winter-season imagery requested, in the form of a mapping swath looking right of track. All features are more subtle under snow. The lake may be partly or even fully iced over).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 7:13am EST [= epoch]):

Mean altitude -- 339.2 km

Apogee height -- 355.1 km

Perigee height -- 323.4 km

Period -- 91.32 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.002361

Solar Beta Angle -- -73.6 deg (magnitude peaking)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 60 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46587

**Significant Events Ahead** (all dates Eastern and subject to change [changes are called out]):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

01/31/07 -- US EVA-6 **(new date)**

02/04/07 -- US EVA-7 **(new date)**

02/08/07 -- US EVA-8 **(new date)**

02/26/07 -- Russian EVA "17.1" (Progress antenna removal) **(new date)**

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 01/09/07  
**Date:** Tuesday, January 09, 2007 1:16:24 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/09/07**

All ISS systems continue to function nominally, except those noted previously or below.

Second day for CDR Mike Lopez-Alegria's 2<sup>nd</sup> NASA/JSC renal (kidney) stone session, collecting urine samples throughout the day and keeping his dietary/metabolic log entries up to date. Last day of diet logging. *[This long-range preventive medicine investigation features daily random ingestion of either potassium citrate or placebo tablets at dinnertime. The NASA-JSC double-blind "Renal Stone" research study investigates methods to prevent formation of kidney stones in zero-G. Part of the experiment consists in keeping a metabolic diet log (food and fluid intake), followed by collection of urine samples several times per day during each session, which terminates tomorrow morning (1/10). The PI (Principal Investigator) receives the diet log data approximately 24 to 48 hours after the diet-logging session is completed.]*

FE-1 Tyurin and FE-2 Williams worked several hours in the Service Module (SM) on a major systems replacement task: - removing the Russian VB-3 cycle ergometer and replacing it with a new unit delivered on 23P, including assembling it from parts and checking it out. The old unit was excessed.

Afterwards, the FE-1 had an hour scheduled for deinstalling and removing the docking mechanism (SSVP) in the hatchway between Progress-357/22P and the DC1. *[The SSVP is the "classic" probe-and-cone type, consisting of an active docking assembly (ASA) with a probe (SSh), which fits into the cone (SK) on the passive docking assembly (PSA). The ASA is mounted on the Progress' cargo module (GrO), while the PSA sits on the docking ports of the SM, FGB and DC1.]*

Tyurin also worked on the "Profilaktika" (MBI-8, "Countermeasures") preventive health maintenance fitness equipment, performing a functional health check on its

TEEM-100M gas analyzer, supported by ground specialist tagup. *[The checkup included voltage continuity tests from the BKK Center Control & Switching Unit using the "Elektronika" Multimeter instrument.]*

Later tonight, the FE-1 will unstow and set up the equipment for tomorrow's (1/10) planned "Urolux" biochemical urine test (PZE MO-9) for the three crewmembers. *[MO-9 is conducted regularly every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for US crewmembers for IMG (Integrated Medical Group) PHS evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. The data are then entered in the Medical Equipment Computer (MEC)'s special IFEP software (In-Flight Examination Program.)]*

The CDR conducted an inventory/audit of WMK (Water Microbiology Kit) equipment, used on board for periodic water sampling.

To conduct his third MedOps WinSCAT (Spaceflight Cognitive Assessment Tool) session (plus one repetition), Mike L-A logged in on the MEC (Medical Equipment Computer) and performed the psychological evaluation exercise on the laptop-based WinSCAT experiment. *[WinSCAT is a time-constrained questionnaire test of cognitive abilities, routinely performed by astronauts aboard the ISS every 30 days before or after the PHS (periodic health status) test or on special CDR's, crewmembers or flight surgeons request.]*

Mikhail Tyurin completed the periodic collection of cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system of the SM SOGS (Pressure Control & Atmospheric Monitoring System). *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

At the HRF1 (Human Research Facility 1) rack, L-A conducted the regular checkout of the MedOps cardiac defibrillator. (Last time done: 11/17/06). *[This periodic routine task is scheduled as soon as possible from Expedition start and every 60 days thereafter. For the checkout, the defib is connected to the 120V outlet, equipped with its battery and then allowed to charge, for about five seconds, to a preset energy level (e.g., 100 joules). After the button-triggered discharge, a console indicator signals success or failure of the test. The pacing signal is downlinked via S-band for 2 min. The HRF was afterwards powered down.]*

Sunita Williams had an hour reserved for moving US hardware delivered by M-

58/23P from the Progress cargo ship to ISS stowage locations, including an EVA US/RS Ethernet cable required for the upcoming Stage EVAs.

Mike L-A continued gathering US trash for loading into the 22P cargo ship-turned-trash can, preparatory to its undocking next week (1/17).

Suni reconfigured the SSC-5 (Station Support Computer 5) and SSC-8 A31p laptops by swapping their power supplies with "Cobalt Brick" units.

Misha completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables.

L-A did the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR, FE-2), TVIS treadmill (FE-1), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copied her, L-A's and Misha's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Today's CEO (crew earth observations) photo targets, in the current LVLH attitude no longer limited by flight rule constraints on the use of the Lab nadir/science window, were **Sierra Madera Impact Crater, Texas** (*looking left for this old [ $<100$  million years] West Texas crater, diameter 13 km. The central uplift is the prominent part of this crater, and the outer ring is less visible. Center point 30.5N 102.9W*), **Red River Basin, Texas** (*land use mapping, especially mapping of less vegetated [more eroded, redder] areas, is the topic of interest. Shooting either side of the prominent Red River, left and right of track. Center point 33.7N 99W*), and **Santa Barbara Coast, California** (*this Long Term Ecological Research [LTER] site includes the Channel Islands and adjacent mainland. Land use change across wider areas is an important element to this research effort. This site still needs detailed imagery for comparison with prior imagery. Center point 34.5N 120.5W*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are

downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:26am EST [= epoch]):

Mean altitude -- 339.3 km  
Apogee height -- 355.2 km  
Perigee height -- 323.3 km  
Period -- 91.32 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0023703  
Solar Beta Angle -- -73.0 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 40 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 46572

**Significant Events Ahead** (all dates Eastern and subject to change [*changes, if any, are called out*]):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry  
01/18/07 -- Progress M-59/24P launch  
01/20/07 -- Progress M-59/24P docking (DC1)  
02/02/07 -- US EVA-6  
02/06/07 -- US EVA-7  
02/10/07 -- US EVA-8  
02/19/07 -- US EVA-9 (Progress antenna removal)  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses  
03/18/07 -- STS-117/13A docking  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/08/07  
**Date:** Monday, January 08, 2007 12:56:58 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/08/07**

All ISS systems continue to function nominally, except those noted previously or below. *Off-duty day for the Expedition 14 crew of CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams as a "hold-over" from yesterday's Russian Orthodox Christmas. Underway: Week 16 of Increment 14.*

FE-1 Mikhail Tyurin performed the routine task of shooting two photos of the docking cone of the DC-1 Docking Compartment's port, currently occupied by the Progress M-57/22P, a standard practice after Russian dockings. These images are used to refine current understanding of docking conditions. The pictures were later downlinked via OCA assets. *[The objective is to take photo imagery of the scratch or scuff mark left by the head of the docking probe on the internal surface of the drogue (docking cone) ring, now rotated out of the passageway. As other crewmembers before him, the FE-1 used the Nikon D1X digital still camera to take two pictures each with the hatch closed down]*

CDR Mike Lopez-Alegria began his second NASA/JSC renal (kidney) stone session, starting the diet log and later setting up the experiment hardware for the 24-hr. void-by-void urine collection starting tomorrow morning and ending on Wednesday morning (1/10). *[This long-range preventive medicine investigation features daily random ingestion of either potassium citrate or placebo tablets. It is Dr. Peggy Whitson's double-blind research study investigating methods to prevent formation of kidney stones in zero-G. Part of the experiment consists in keeping a metabolic diet log (food and fluid intake), followed by collection of samples several times per day.]*

Working off his voluntary "time permitting" task list, Tyurin performed another run of the Russian "Diatomeya" ocean observations program, using the NIKON-F5 (85 mm lens) still camera and the SONY PD-150P camcorder, to provide lacking comparable January data of color contrast blooms and hydrothermal effects at low Sun, atmospheric conditions along the flight path at target areas of the Pacific and

Atlantic Oceans. *[Target areas in the Atlantic and Pacific were Peru Current area, Caribbean Sea, Sargasso Sea, Newfoundland Island, and the coastal area of Portugal.]*

FE-2 Sunita Williams performed the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Suni also completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables.

At ~9:30am EST, Suni set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, and power supply) and at 9:35am conducted a ham session with students at Sherman Elementary School in Henrietta, NY. *["What is your opinion about Pluto losing its status as a planet?"; "What do you do if you get sick? Can you take a sick day?"; "A while back we heard on the news that while the astronauts were putting a solar panel on, a screw was accidentally dropped. Why would this be such a big deal?"]*

A second ham radio exchange was conducted by Williams at 12:35pm, this time with students at Dilworth Elementary School in San Jose, CA. *["What is NASA doing to reduce pollution?"; "Why are astronaut's spacesuits mostly white?"; "Do you bob up and down or do you get strapped in when you sleep?"; "How do you take a bath with water floating around?"]*

At ~12:15pm, Mike L-A had his weekly PFC (Private Family Conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

The crew completed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR), TVIS treadmill (CDR, FE-1, FE-2), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copied her, L-A's and Misha's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

No CEO (Crew Earth Observations) photo targets uplinked today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (as of this morning, 8:04am EST [= epoch]):

Mean altitude -- 339.3 km  
Apogee height -- 355.2 km  
Perigee height -- 323.4 km  
Period -- 91.32 min.  
Inclination (to Equator) -- 51.63 deg  
Eccentricity -- 0.0023712  
Solar Beta Angle -- -71.0 deg (magnitude increasing)  
Orbits per 24-hr. day -- 15.77  
Mean altitude loss in last 24 hours -- 70 m  
Revolutions since FGB/Zarya launch (Nov. 98) -- 46556

**Significant Events Ahead** (all dates Eastern and subject to change [*changes, if any, are called out*]):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry  
01/18/07 -- Progress M-59/24P launch  
01/20/07 -- Progress M-59/24P docking (DC1)  
02/02/07 -- US EVA-6  
02/06/07 -- US EVA-7  
02/10/07 -- US EVA-8  
02/19/07 -- US EVA-9 (Progress antenna removal)  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses  
03/18/07 -- STS-117/13A docking  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/07/07  
**Date:** Sunday, January 07, 2007 11:56:24 AM  
**Attachments:**

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### **ISS On-Orbit Status 01/07/07**

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for the Expedition 14 crew of CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams. Russian Orthodox Christmas – thus another holiday tomorrow. Ahead: Week 16 of Increment 14. **S Rodzhestvom Kristovym!***

At ~4:45am EST, FE-1 Tyurin received a 10-minute VIP call via VHF/audio from Patriarch Alexis II of the Russian Orthodox Church, speaking from TsUP/Moscow and extending best wishes to the crew on the occasion of today's Orthodox Christmas celebration.

FE-2 Williams completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables, the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP.

Working off his discretionary "free time" task list, Misha Tyurin conducted the periodic check of the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the MATRYOSHKA-R payload in the DC1 Docking Compartment. *[The reader automatically records radiation readings at strictly defined times (:00, :15, :30, :45 minutes). The complex Matryoshka payload suite is designed for sophisticated radiation studies. The payload collects radiation measurements every 15 minutes of each hour around the clock. Note: Matryoshka is the name for the traditional Russian set of nested dolls, also called Babushka dolls when they are little old ladies ("grandmas").]*

Williams and Tyurin had their weekly PFCs (Private Family Conferences), Mikhail at ~5:50am, Sunita at ~9:03am (S-band/phone, due to video failure) and another scheduled at 2:52pm.

At ~5:15am EST, Suni set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, power supply) and at 5:18am conducted a ham session with participants in the Australian Scout Jamboree 2007 at Elmore, Victoria/Australia (AJ2007). The Jamboree is held every three years, traditionally in early January, running for 10 days. The current event, the 21<sup>st</sup> AJ, is taking place January 1-13, with 13,000 to 15,000 adults and youth in attendance. [*“Have you ever seen an alien?”; “Have you ever been a scout or known an astronaut who was one?”; “Do you have a different view of the Earth now that you are on the other side?”; “How do you get your vitamin D intake – we get it from the sun, where do you get it from?”*]

The crew completed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR), TVIS treadmill (FE-1, FE-2), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

No CEO (Crew Earth Observations) photo targets uplinked today.

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:21am EST [= epoch]*):

Mean altitude -- 339.4 km

Apogee height -- 355.0 km

Perigee height -- 323.7 km

Period -- 91.32 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0023311

Solar Beta Angle -- -67.8 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 220 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46539

**Significant Events Ahead** (all dates Eastern and subject to change [*changes, if any, are called out*]):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7  
02/10/07 -- US EVA-8  
02/19/07 -- US EVA-9 (Progress antenna removal)  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses  
03/18/07 -- STS-117/13A docking  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 01/06/07  
**Date:** Saturday, January 06, 2007 3:26:13 PM  
**Attachments:**

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**ISS On-Orbit Status 01/06/07**

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams.*

The crew conducted the regular weekly three-hour task of thorough station cleaning, wearing protective garment. *["Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with "Fungistat" disinfectant wipes; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of today's *uborka*, FE-1 Tyurin replaced four dust filters (PF1-4) and cleaned the VD-1,2 and V1,2 air ducts in the Service Module (SM)'s ventilation system, then worked in the Docking Compartment (DC-1) "Pirs", exchanging two spent dust collector filters (PF1-2). The old units were disposed as trash.

CDR Lopez-Alegria and FE-2 Sunita Williams completed another filling out of the regular weekly FFQ (Food Frequency Questionnaire) on the MEC (Medical Equipment Computer), his fourteenth and Suni's third, which keeps a personalized log of their nutritional intake over time on special MEC software. *[The FFQ, updated with the new food brought up on 12A.1, records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. IBMP/Moscow (Institute of Biomedical Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value of the crew's food intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]*

Williams made the rounds servicing laptops, first performing the regular bi-monthly reboot of the OCA (Orbit Communications Adapter) Comm Router and File Server, then the weekly rebooting of all PCS (Portable Computer System) A31p's.

Mike L-A completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including the ASU toilet facilities systems/replaceables.

Working off his voluntary "time permitting" task list, Mikhail Tyurin performed another run of the Russian "Diatomeya" ocean observations program, today "nocturnal" ocean observations to see whether it is possible to identify and video record areas with intensive bioproduction from space based on bio-luminescent glow of water. *[Target area was the Indian Ocean (typhoon areas, main currents with dynamically active regions, and large ocean-bed fault areas). Luminescence is caused by external factors (including underwater earthquakes) and affects the population of aquatic microorganisms; this effect supposedly can be observed from space as bluish or light-green spots, bands, or concentric rings.]*

Also from the task list, Misha used the Nikon D1X (SIGMA 300-800mm telephoto lens) to take aerial KPT-3 photography for Russia's Environmental Safety Agency (ECON) of the surroundings of large U.S. cities. *[KPT-3 photography is a frequent earth observing experiment for ECON.]*

At ~7:00am EST, the crew had their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

The crew completed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A copied his, Misha's and Suni's exercise data files to the MEC for downlink.

*Uplink to Lopez-Alegria and Williams from Flight Control: "LA and Suni - fantastic job all week on the OGS Rack."*

**Weekly Science Update** (*Expedition Fourteen -- 15<sup>th</sup>*)

*ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS): ALTEINO*

is functioning nominally.

*ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):* Planned.

*BASE:* Complete.

*BCAT-3 (Binary Colloidal Alloy Test-3):* Planned.

*CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA):* Complete.

*CBOSS (Cellular Biotechnology Support Systems):* Complete.

*CFE (Capillary Flow Experiment):* Complete.

*CULT (Cultural Factors Questionnaire):* Complete.

*DAFT (Dust & Aerosol Measurement Feasibility Test):* Complete.

*Earth Knowledge Acquired by Middle School Students (EarthKAM):* In progress.

*ETD (Eye Tracking Device):* Complete for Thomas Reiter.

*GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology):* Planned

*GRAVI (Threshold Acceleration for Gravisensing):* Experiment execution is currently scheduled between 1/15 and 1/20. Planning to be confirmed.

*IMMUNO (Saliva Sampling):* Complete.

*LEUKIN:* Complete.

*MISSE (Materials ISS Experiment):* Ongoing.

*MTR-2 (Russian radiation measurements):* Passive dosimeters measurements in DC1 "Pirs". Removal of passive dosimeters from the MATRYOSHKA Phantom was performed on 12/07 and returned on STS-12A.1.

*NOA (Nitric Oxide Analyzer):* Complete.

*Nutrition:* "Many thanks to Suni and L-A for the great work on the Nutrition session. Your perseverance was greatly appreciated."

*PK-3 (Plasma Crystal 3)*: In progress.

*PMDIS (Perceptual Motor Deficits in Space)*: Sunita Williams has completed the first PMDIS activity on orbit.

*POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G)*: Complete.

*RC (Refrigerated Centrifuge)*: Planned.

*RS (Renal Stone)*: Planned (CDR only).

*SAMPLE*: Complete.

*SEM (Space Experiment Module)*: Complete.

*SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight)*: “Thanks to Suni for downloading and reinitializing the Actiwatches this past Wednesday.” The data continue to look good for the experiment. The Sleep Log can continue to be completed beyond the schedule per crew preference.

*SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite)*: In progress.

*Swab (Characterization of Microorganisms & Allergens in Spacecraft)*: Planned.

*TRAC (Test of Reaction & Adaptation Capabilities)*: “The TRAC team would like to say thank you for your support during TRAC operations this week. The video of the sessions proved to be valuable and we look forward to reviewing the video recording.”

*TROPI (Study of Novel Sensory Mechanism in Root Phototropism)*: All TROPI data runs are now complete. Four Ziploc bags from runs 1 and 2, and 4 EMCS Cold Stowage Bags from run 3 containing frozen samples are stored in MELFI, awaiting return.

*YING (Yeast in No Gravity)*: Complete.

*CEO (Crew Earth Observations)*: A long and thorough session documents the entire west coast of Madagascar. Another long more detailed series (400 mm lens) documents the Rio Negro in W Amazonia. A sector of the River Negro with numerous islands was displayed on NASA’s Earth Observatory website. Another

very detailed image (800 mm lens) showing Dyess Air Force Base in Abilene, TX, appears on the website as the CEO contribution for this week.

Today's CEO (crew earth observations) photo targets, in the current LVLH attitude no longer limited by flight rule constraints on the use of the Lab nadir/science window, were **Tigris-Euphrates Delta** (*nadir pass over this complex coast. Extensive wetland drainage immediately upstream, over decades, is generating unusually large amounts of sediment at the delta. Detailed images were requested. Center point 30.4N 48E*), and **Dust Storms, Chad** (*Dynamic event. The Chad basin is the area most prone to dust storms in Africa, with dust from this basin often reaching the Atlantic, and even the Americas. Dust source areas lie north of Lake Chad [visual cue] right of track. By the time of this pass the dust may have spread well west, i.e. left of track. Of greatest geology interest are source points where dust plumes originate, and plume margins. Center point: left and right of track for ~2.5 minutes*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**Significant Events Ahead** (all dates Eastern and subject to change):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry  
01/18/07 -- Progress M-59/24P launch  
01/20/07 -- Progress M-59/24P docking (DC1)  
02/02/07 -- US EVA-6  
02/06/07 -- US EVA-7  
02/10/07 -- US EVA-8  
02/19/07 -- US EVA-9 (Progress antenna removal)  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses  
03/18/07 -- STS-117/13A docking  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
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05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).



**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#);  
**CC:**  
**Subject:** ISS On-Orbit Status 01/05/07  
**Date:** Friday, January 05, 2007 2:03:46 PM  
**Attachments:**

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**ISS On-Orbit Status 01/05/07**

All ISS systems continue to function nominally, except those noted previously or below.

After yesterday's successful installation by CDR Lopez-Alegria and FE-2 Williams of both the OGS (Oxygen Generation System) fluid and electrical connections on the new Z-panel, followed by the re-installation of the OGS rack at the LAB1P1 location, today's work consisted of installing the feed-water system ORU (Orbit Replaceable Unit) on the face of the OGS rack, re-installing the LAB1D1 smoke detector, and final cleanup. *[OGS is one of the three Regenerative ELCSS system racks slated to be installed in Node 3. The current partial installation of major components in the Lab is a preparatory testing step as OGS is as yet unproven/untested in a space environment and critical to support six-person ISS crew operations. Some of the required reconfigurations in the Lab included installing new cables/hoses, integrated into existing Lab hardware, setting up new rack/standoff structures, performing a software upgrade, and converting a water vent into a hydrogen/nitrogen (H<sub>2</sub>/N<sub>2</sub>) vent. The external OGS H<sub>2</sub> vent nozzle will be installed via spacewalk on Flight 13A, followed by software upgrades during the 14S stage. Actual OGS activation will be performed by the Increment 15 crew. Note on Lab rack topology: P=Port; S=Starboard; O=Overhead; D=Deck. Numbers 1 thru 6, beginning at the forward hatch, designate rack bays/sections. In general, there are three types of racks in the U.S. segment (USOS): System (e.g., MDMs, RPCMs, ITCS pumps), Payload, and Stowage (ZSRs, RSRs, RSPs).]*

FE-1 Tyurin concluded outfitting the SOTR ventilation system in the Service Module (SM) with two new noise-isolated crew cabin fans (VKYu-1, VKYu-2), sound deadening vibration isolators and air ducts with acoustic shields. After yesterday's installation of the first fan (VKYu-1) and its associated new air duct and vibration isolator, the crew reported that the fan is working very quietly. Today, Tyurin

completed the work with the installation of the second ventilator (VKYu-2) and its ancillary systems, again supported by ground specialist tagup.

The CDR had two hours reserved for gathering US trash and other discarded equipment to be loaded in Progress M-57/22P, in preparation for its undocking on 1/17.

Mikhail Tyurin spent an hour with the standard Russian PFE (Physical Fitness Evaluation) test MO-3, his third, using the TVIS treadmill for workout (in unmotorized mode) and wearing the Cardiocassette KK-2000 belt with three chest electrodes. (Last time done: 12/4/06) *[The test, controlled from the RSE-Med laptop, yields ECG (electrocardiogram) readings to the Cardiocassette-2000, later to be downlinked via U.S. OCA. For the ECG, the FE-1 worked out on the TVIS, first walking 3 min. up to 3.5 km/h, then running at a medium pace of 6.5 km/h, followed by the maximum pace not exceeding 10 km/h, then walking again at gradually decreasing pace.]*

FE-2 Williams completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM.

Misha Tyurin later worked on the ASU toilet facilities systems/replaceables, performing the periodic replacement of the toilet's urine receptacle (M-P) and filter insert (F-V) and stowing the old units for disposal.

Sunita conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Suni also performed the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Misha replaced the PCMCIA memory card in the LAZIO (*Low Altitude Zone Ionization Observatory*) experiment, which studies charged particle radiation on orbit. The accumulated data on the card were checked for volume and the card marked and stowed for downlink or return to Earth. *[The Italian LAZIO payload, with the AST spectrometer, EGLE magnetometer, MEB main electronics box, etc, was set up and operated last year by VC8 guest cosmonaut Roberto Vittori in the DC-1.]*

The FE-1 conducted the periodic (monthly) functional closure test of a spare emergency vacuum valve (AVK) for the Vozdukh CO<sub>2</sub> removal system, in the spare parts kit. *[The AVKs are critical because they close the Vozdukh's vacuum access lines in the event of a malfunction in the regular vacuum valves (BVK) or a depressurization in the Vozdukh valve panel (BOA). Access to vacuum is required to vent carbon dioxide (CO<sub>2</sub>) during the regeneration of the absorbent cartridges (PP). During nominal operation, the AVK valves remain open.]*

The FE-2 performed her third periodic atmospheric status check for ppO<sub>2</sub> (Partial Pressure Oxygen) and ppCO<sub>2</sub> (pp Carbon Dioxide), using the CSA-O<sub>2</sub> (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO<sub>2</sub> Monitoring Kit). Batteries were to be replaced if necessary. *[CSA-CP measurements were gathered with the new 12A.1 units #1044 (prime) & #1051 (backup) for recording O<sub>2</sub>, CO, HCN and HCl readings at the SM Central Post and in the Node, with the CSA-O<sub>2</sub> units #1041 & #1048 for O<sub>2</sub> in the Lab, and with the CDMK #1009 for CO<sub>2</sub> in SM and Lab, along with battery ticks. The instruments were turned off afterwards, except for #1044, and returned to their regular locations.]*

Cabin air readings in the ISS were also collected by Misha Tyurin with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system. *[GANK tests for Methane (CH<sub>4</sub>), Ammonia (NH<sub>3</sub>), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO<sub>2</sub>), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

In addition, the FE-1 performed in-flight maintenance on the Russian geophysical GFI-1 Relaksatsiya ("relaxation") experiment by putting together its UFS-1 filter assembly from newly delivered components. *[Relaksatsiya normally deals with the study of the chemoluminescent chemical reactions and atmospheric light phenomena (emissions, i.e., molecular relaxation processes) that occur during high-velocity interaction between the exhaust products from space vehicles and the atmosphere at orbital altitude and during the entry of space vehicles into the Earth's upper atmosphere.]*

The crew completed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR, FE-2), TVIS treadmill (FE-1), RED (FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A copied his, Misha's and Suni's exercise data files to the MEC

(Medical Equipment Computer) for downlink.

At ~3:15am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~3:45am EST, Tyurin linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Today's issues included IMS information on the stowage location of the DS-7A smoke detectors dismantled on 12/28, IMS updates performed by the ground, actual contents of a bag labeled "old EVA and Orlan equipment" but listed in the IMS as containing 7 dust filters, etc.]*

At ~4:10am, L-A and Suni participated in a live televised PAO/educational Q&A event conducted with the Columbia Explorers Academy at the Adler Planetarium in Chicago, IL. *[The event involved over 300 students, teachers and guests assembled at the Planetarium, mostly Hispanic/Latino attendees. The event was part of a larger program to bring current science topics and science speakers to students and teachers.]*

At ~2:40pm, the crewmembers are scheduled for their regular weekly tagup with the Lead Flight Director at JSC/MCC-H.

*Impact of High Beta:* In the current LVLH -XVV (local vertical local horizontal/ minus x-vector in velocity vector) attitude, the upcoming high Beta angle period (>60 deg) presents some power challenges for the station, due to severe off-pointing of the 2B array. For the week of 1/6-1/12, Channel 2B loads will be supported by the 2A array (which reduces power margins for payload ops and other utilization loads next week). The transfer will be done tomorrow "seamlessly" by ground commanding. This is a unique constraint to the 12A.1 Stage configuration at Betas of very high magnitude (coming back down below 60 deg on 1/14). *[Beta angle is the angle between the solar vector (i.e., the imaginary line from the ISS to the Sun) and the orbit plane. For Shuttle/ISS missions, Beta cannot be above +/-60 deg during mated operations (driven primarily due to thermal concerns for both Shuttle and ISS). A "Beta Cut-Out" is the period of time that the Shuttle cannot launch due to the Beta angle being above +/-60 degrees during Shuttle/ISS combined operations. It is determined by the latest Shuttle undock day (cut-out start) and earliest shuttle dock day (cut-out end).]*

Today's CEO (crew earth observations) photo targets, in the current LVLH attitude no longer limited by flight rule constraints on the use of the Lab nadir/science window, were **Gweni-Fada Impact Crater, Chad** (*this 14-km diameter crater lies in eastern Chad. From the age of the rocks impacted, the crater is dated as less than*

*345 million years old. The crater stands out fairly well due to its recognizably circular shape, and the dark rocks in which it has formed. Center point 17.5N 21.75E), and **Lake Nasser, Toshka Lakes, Egypt** (reversing the 18-month trend of declining water inflow to the Toshka Lakes [decreasing lake size], new lakes have appeared west. They were documented during ISS-13 and during the beginning of ISS-14. Further changes are suspected. Near-nadir view. Center point 23.25N 31.5E).*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:12am EST [= epoch]*):

Mean altitude -- 339.6 km

Apogee height -- 355.5 km

Perigee height -- 323.7 km

Period -- 91.33 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0023669

Solar Beta Angle -- -59.6 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 118 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46508

**Significant Events Ahead** (all dates Eastern and subject to change):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

02/19/07 -- US EVA-9 (Progress antenna removal)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/04/07  
**Date:** Thursday, January 04, 2007 1:18:27 PM  
**Attachments:**

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### ISS On-Orbit Status 01/04/07

All ISS systems continue to function nominally, except those noted previously or below.

After yesterday's "great work" by the crew on the OGS (Oxygen Generation System) component installation (as praised by Flight Control), CDR Lopez-Alegria and FE-2 Williams today continued with Day 3 activities. Required were removal & replacement of a UIP (Utility Interface Panel, i.e., the "Z-panel" at LAB1P1) with a new one, installation of a new MDM computer data cable, making fluid and electrical connections on the new Z-panel, and returning the OGS rack to its original LAB1P1 location. More work is scheduled tomorrow, including re-installation of the smoke detector. *[The partial installation of the new OGS this week is an involved procedure that is consuming the better part of four days (1/2-1/5). OGS is one of the three Regenerative ELCSS system racks slated to be installed in Node 3. But some OGS components are already being installed in the Lab as this system is as yet unproven/untested in a space environment and critical to support six-person ISS crew operations. Some of the required reconfigurations in the Lab include installing new cables/hoses that will be integrated into existing Lab hardware, setting up new rack/standoff structures, performing a software upgrade, and converting a water vent into a hydrogen/nitrogen (H<sub>2</sub>/N<sub>2</sub>) vent. Note on Lab rack topology: P=Port; S=Starboard; O=Overhead; D=Deck. Numbers 1 thru 6, beginning at the forward hatch, designate rack bays/sections. In general, there are three types of racks in the U.S. segment (USOS): System (e.g., MDMs, RPCMs, ITCS pumps), Payload, and Stowage (ZSRs, RSRs, RSPs).]*

FE-1 Tyurin continued outfitting the SOTR ventilation system in the Service Module (SM) with two new noise-isolated crew cabin fans (VKYu-1, VKYu-2), sound deadening vibration isolators and air ducts with acoustic shields. Today's task: replacing the first fan (VKYu-1) and its associated new air duct and vibration isolator plus connecting it to its BRUS speed control unit. More work, on the second ventilator, is scheduled for tomorrow.

After setting up the necessary pump/hose hookup, Tyurin performed the final transfer of urine from two EDV-U liquid waste containers to the BV2 “Rodnik” water tank of the 22P cargo ship-turned-trash can for disposal. *[Each of the two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane. BV2 can contain liquid waste from nine EDV-Us, and seven containers had already been pumped over. After the transfer, the lines were flushed with disinfectant solution.]*

Later, the FE-1 completed today’s routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Misha Tyurin also conducted the daily updating/editing of the standard IMS (Inventory Management System) “delta” file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR, FE-2), TVIS treadmill (FE-1), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Misha copied his, L-A’s and Suni’s exercise data files to the MEC (Medical Equipment Computer) for downlink. *[The ground is currently troubleshooting an HRM (Heart Rate Monitor) watch.]*

At ~6:40am EST, Mikhail Tyurin downlinked Russian video greetings and congratulations to the First Russian Youth Science Readings in honor of Sergey Pavlovich Korolev (celebrating his 100<sup>th</sup> birthday on 1/12; also: the 150<sup>th</sup> birthday of K.E. Tsiolkovsky, and the 50<sup>th</sup> anniversary of Sputnik 1), scheduled for January 18-19, with the participation of university and grade-school students from Moscow, Moscow Oblast, St. Peterburg, Archangel, Vologda, Irkutsk, Kaluga, Nizhny Novgorod, Novosibirsk, Samara, Republic of Kazakhstan and Ukraine. Location: the S.P. Korolev Memorial Museum, newly opened last month after renovation. *[Main objectives of the Readings: “To stimulate trainees for in-depth study of the achievements of cosmonautics, to scout and provide support for gifted students, to promote innovative aerospace educational programs using Earth images from space, and to provide career guidance to a younger generation.”]*

At ~2:35pm, Mike L-A will hold a private teleconference via S-band/audio and Ku-

band/MS-NetMeeting application (which displays the uplinked ground video on a laptop, currently SSC-8 in the Lab at portside). Later tonight (~6:00pm) the CDR is also scheduled for his weekly PFC (Private Family Conference) via NetMeeting.

The oxygen (O<sub>2</sub>) supply remaining in Progress M-57/22P has been used up to refresh the ISS cabin atmosphere. The Elektron O<sub>2</sub> generator continues to operate nominally after having been switched to 24 amps yesterday (current/amperage determines performance, i.e., output). *[22P is to be undocked from the DC1 Docking Compartment on 1/17, followed by launch of 24P on 1/18.]*

Today's CEO (crew earth observations) photo targets, in the current LVLH attitude no longer limited by flight rule constraints on the use of the Lab nadir/science window, were **Congo Basin** (*Dynamic event. Congo basin is unusually clear of cloud. Shooting left and right to document river patterns. Glint point off track right. Center point: along line of track for ~3 min.*), **Khartoum, Sudan** (*looking just left of track for the twin cities of Khartoum and Omdurman where the Blue and White Niles meet. Omdurman is growing rapidly due to influxes of refugees; impermanent structures make this city less visible than Khartoum. Omdurman lies on the west bank of the Nile. Center point 15.5E 32.4N*), and **Tigris-Euphrates Delta** (*Nadir pass: detailed images of the mobile mouths of the delta were requested. Center point 30E 48N*).

CEO photography can be viewed and studied at the websites:  
<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);  
<http://earthobservatory.nasa.gov/>  
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 8:04am EST [= epoch]*):

Mean altitude -- 339.7 km

Apogee height -- 355.4 km

Perigee height -- 324.0 km

Period -- 91.33 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0023427

Solar Beta Angle -- -55.0 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 175 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46493

**Significant Events Ahead** (all dates Eastern and subject to change):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch  
01/20/07 -- Progress M-59/24P docking (DC1)  
02/02/07 -- US EVA-6  
02/06/07 -- US EVA-7  
02/10/07 -- US EVA-8  
02/19/07 -- US EVA-9 (Progress antenna removal)  
03/16/07 -- STS-117/13A launch -- S3/S4 trusses  
03/18/07 -- STS-117/13A docking  
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry  
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)  
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)  
04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)  
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry  
05/12/07 -- Progress M-60/25P launch  
05/14/07 -- Progress M-60/25P docking (DC1)  
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)  
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/03/07  
**Date:** Wednesday, January 03, 2007 12:30:15 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/03/07**

All ISS systems continue to function nominally, except those noted previously or below.

For CDR Lopez-Alegria and FE-2 Williams it was Day 2 of OGS (Oxygen Generation System) component installation in the Lab. Today's tasks were removal of the OGS rack (LAB1P1) and a smoke detector to allow for subsequent down & up rotation of the AV2 rack (Avionics 2/LAB1D1) for connecting H<sub>2</sub>/N<sub>2</sub> vent and water hoses, followed by reinstallation of the OGS rack and smoke detector. More work is scheduled tomorrow and Friday. *[The partial installation of the new OGS this week is an involved procedure that consumes the better part of four days (1/2-1/5). OGS is one of the three Regenerative ELCSS system racks slated to be installed in Node 3. However, some OGS components are already being installed in the Lab as this system is as yet unproven/untested in a space environment and critical to support six-person ISS crew operations. Some of the required reconfigurations in the Lab include installing new cables/hoses that will be integrated into existing Lab hardware, setting up new rack/standoff structures, performing a software upgrade, and converting a water vent into a hydrogen/nitrogen (H<sub>2</sub>/N<sub>2</sub>) vent.]*

FE-1 Tyurin too had a major IFM (Inflight Maintenance) assignment, i.e., outfitting of the SOTR ventilation system in the Service Module (SM) with two new noise-isolated crew cabin fans (VKYu-1, VKYu-2), sound deadening vibration isolators and air ducts with acoustic shields. Today's task focused on setting up the fans with their new BRUS speed control units. More work is scheduled for tomorrow and Friday.

FE-2 Sunita Williams configured her and Lopez-Alegria's SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) Actiwatches for data downloading. After the data transfers, the devices were re-initialized for another data take by the

two crewmembers. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the crewmembers' sleep/wake patterns and light exposure, they wear the special Actiwatch device which measures the light levels encountered by them as well as their patterns of sleep and activity throughout the Expedition.]*

After ground-commanded deactivation of the Russian BSV-M frequency & time synchronization unit on the System Power Panel (PPS) master clock unit (which required the FE-1 to switch the Vozdukh CO2 scrubber to automatic control), Tyurin deinstalled the MMK-2 electronics box of the SMMK "Meteoroid" sensor in the SM PkhO (Transfer Compartment). Afterwards, when TsUP/Moscow had reactivated BSV-M, Mikhail switched the Vozdukh back to manual Mode 5. *[The TEKh-5 "Meteoroid" experiment is mounted on the external surface of the SM to register particle impacts.]*

Tyurin also performed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown.]*

Lopez-Alegria performed the scheduled CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance, today also deactivating and stowing the two old 23P-delivered units (#1055, #1053) which are being replaced with new 12A.1 CSA-CP units (#1044, #1051). *[L-A changed out the prime unit's battery, then zero-calibrated both instruments. Following zero calibration, the backup unit was stowed, while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

Misha Tyurin completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and today also the periodic checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatch openings (8) in the SM, FGB and DC1.

Mike L-A conducted the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

L-A also did the periodic (once per month) routine inspection of the RED (Resistive

Exercise Device) with canister cords, squat harness components, and accessory straps, and the Flexpack canister bolts for re-tightening if required.

Suni performed the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

The crew completed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR, FE-2), TVIS treadmill (FE-1), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, the CDR copied his, Misha's and Suni's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At 1:55pm EST Mike L-A conducted the periodic VHF1 emergency communications check over NASA VHF (very high frequency) sites at Dryden (~1:57pm), White Sands (~2:01pm) and Wallops Island (2:09pm), talking with Houston/Capcom, MSFC/PAYCOM (Payload Operation & Integration Center Communicator) and Moscow/Glavni (TsUP Capcom) in the normal fashion via VHF radio from a handheld microphone and any of the U.S. segment ATUs (audio terminal units). *[The test is to verify signal reception and link integrity, and to ensure minimum required link margin during emergency and special events (such as a Soyuz relocation). Last time done: 12/1/06.]*

A new addition to L-A's discretionary "job jar" task list for today was to troubleshoot a DCS-760 (Digital Camera System) memory card to attempt image recovery. *[Two methods were suggested: using the EarthKAM software to let it try to transfer images, and checking the card with the Kodak Camera Manager software.]*

The "Test of Reaction & Adaptation Capabilities" payload ground team uplinked words of satisfaction and thanks for the crew's successful first-day performance yesterday with the new NASA-sponsored German/Canadian TRAC experiment.

The onboard GNC MDMs (Guidance, Navigation & Control Multiplexer/ Demultiplexer computers) are being swapped today to make GNC-1 the primary unit and GNC-2 backup, to prevent a possible power loss during a scheduled ground-commanded troubleshooting of the failed RPC-5 (Remote Power Controller #5) in a Lab RPCM (RPC Module).

Uplinking of regular CEO (Crew Earth Observations) targets will resume tomorrow.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 6:31am EST [= epoch]*):

Mean altitude -- 339.9 km

Apogee height -- 355.8 km

Perigee height -- 324.0 km

Period -- 91.33 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0023695

Solar Beta Angle -- -50.3 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 130 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46476

**Significant Events Ahead** (all dates Eastern and subject to change):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

02/19/07 -- US EVA-9 (Progress antenna removal)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/02/07  
**Date:** Tuesday, January 02, 2007 12:47:45 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/02/07**

All ISS systems continue to function nominally, except those noted previously or below.

The crew had their first day with the new NASA-sponsored German/Canadian experiment TRAC (Test of Reaction & Adaptation Capabilities). FE-2 Williams installed the experiment hard drive with the experiment software in the payload computer and assembled the hardware in the work area (i.e., laptop, joystick, headphones, time box). Afterwards, the three crewmembers performed their first data take sessions. *[TRAC tests the idea that the decrease in motor skills reported by some astronauts (for example, hand-eye coordination), is due to the brain adapting to being in space. By testing hand/eye coordination of crewmembers, scientists hope to test the theory that while the brain is adapting its sensory-motor functions to space it is unable to fully provide the resources necessary to perform normal manual skills, i.e., the data will be used to show that adaptation to zero-G draws on resources normally used for computational tasks, for example. Crewmembers test their hand-eye coordination prior to the mission, while on orbit and then again when they have returned to Earth. The tests are conducted in seven sessions occurring in one-week intervals toward the end of the Increment. TRAC hardware includes a laptop mounted to a table and a joystick to control the cursor on the PC screen. Also used are audio headphones and a reaction time box to respond to audio and visual stimuli. For the test the crewmember is sitting on the floor of the Lab module, with legs restrained and the work table on the legs.]*

The CDR completed the weekly audit/inventory of the available CWCs (Contingency Water Containers) and their contents, which keeps a running account of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

FE-1 Tyurin conducted a comprehensive audit of RODFs (Russian Operations Data Files) or "cue cards", using an uplinked listing of ~50 ODFs for verifying their ID

number and location or correcting any discrepancies. *[Any unlisted ODFs found were to be reported to TsUP/Moscow and discarded.]*

Lopez-Alegria and Williams conducted a tagup with the ground on the upcoming major OGS (Oxygen Generation System) installations. They then completed Day 1 activities, i.e., reconfiguring stowage, gathering tools & equipment, assembling hardware and also swapping hoses on the H<sub>2</sub>/N<sub>2</sub> vent valve ports which were connected to the incorrect valve ports while on the ground. *[Background: Mike's and Suni's main activities this week center on the (partial) installation of the new OGS (Oxygen Generation System), a long, highly complicated procedure that will consume the better part of four days (1/2-1/5). The OGS is one of the three Regenerative ELCSS system racks slated to be installed in Node 3. However, some OGS components will already be installed in the Lab as this system is as yet unproven/untested in a space environment and critical to support six-person ISS crew operations. Some of the required reconfigurations in the Lab will include installing new cables/hoses that will be integrated into existing Lab hardware, setting up new rack/standoff structures, performing a software upgrade, and converting a water vent into a hydrogen/nitrogen (H<sub>2</sub>/N<sub>2</sub>) vent.]*

Tyurin completed the third-day activity with the Russian SZM-MO-21 "Ecosfera" experiment, inspecting and assessing bacteria colonies grown on "Medium #2" Petri dishes since 12/26. Another sample assessment, on "Medium #1", was performed on 12/28. *[The equipment, which includes an air sampler set, a charger, power supply unit, and incubation tray for Petri dishes, determines microbial contamination of the ISS atmosphere, specifically the total bacterial and fungal microflora counts and microflora composition according to morphologic criteria of microorganism colonies.]*

The FE-1 also conducted noise level measurements in the Service Module (SM) station interior, using the U.S. SLM (sound level meter) for a 50 min acoustic survey to measure background noise before the planned installation of new sound deadening vibration isolators and air ducts with acoustic shields. Noise will again be recorded after the outfitting. SLM data were transferred to the MEC (Medical Equipment Computer) for subsequent downlink. *[The outfitting of the SM is scheduled for tomorrow, Thursday, and Friday (1/3-1/5) and will focus on the VKYu-1 and VKYu-2 crew cabin fans, each one to be configured for manual control with a manual fan speed control device (BRUS).]*

Afterwards, Mikhail Tyurin gathered and prepared the tools and equipment required for the upcoming SOTR ventilation system acoustic outfitting. *[Newly delivered SOTR equipment for the job includes the two VKYu fans, BRUS speed control units, jumper cables, vibration isolator shells and flanges, air ducts, and fastener kit.]*

Misha then completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

L-A did the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew completed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR), TVIS treadmill (FE-1, FE-2), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A copied his, Misha's and Suni's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

For Lopez-Alegria, the ground is proposing a session of the "traditional" Saturday Science for 1/6, at his discretion. Suggested is a checkout run of the HRF-1 USND (Human Research Facility 1/Ultrasound) system. *[The USND has not been activated since it was relocated on 6/17/06 and, although research hardware, could be very useful in case of an injury. L-A's involvement would be to set up the USND system and let it run unattended for 2-4 hours before powering it down and stowing it.]*

At ~11:05am EST, the station was maneuvered on USTO (US Thruster Only) control through ~180 deg from +XVV to -XVV (minus x-axis in velocity vector) attitude. *[The USTO controller commands the Russian thrusters without requiring handover between US/Russian MCSs (motion control systems). Today's maneuver required thruster firings, during which the Lab science window had to remain closed.]*

For CEO (Crew Earth Observations), investigators uplinked a long list of geographical coordinates of selected cities for orbital imagery during the next few days.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

**ISS Orbit** (*as of this morning, 7:44am EST [= epoch]*):

Mean altitude -- 340.0 km

Apogee height -- 356.1 km

Perigee height -- 323.9 km

Period -- 91.33 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.002391

Solar Beta Angle -- -45.4 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 94 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46461

**Significant Events Ahead** (all dates Eastern and subject to change):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

02/19/07 -- US EVA-9 (Progress antenna removal)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

**From:** [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)  
**To:** [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)  
**CC:**  
**Subject:** ISS On-Orbit Status 01/01/07  
**Date:** Monday, January 01, 2007 12:58:14 PM  
**Attachments:**

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### **ISS On-Orbit Status 01/01/07**

All ISS systems continue to function nominally, except those noted previously or below. *Off-duty day for CDR Lopez-Alegria, FE-1 Tyurin & FE-2 Williams.*

*Underway: Week 15 of Increment 14.*

*Happy 2007! S Novijm 2007 Godom!*

The crew began the New Year with the routine checkup of Docking Compartment (DC1) circuit breakers and fuses as part of morning inspection. *[The monthly checkup in the "Pirs" DC1 looks at AZS circuit breakers on the BVP Amp Switch Panel (they should all be On) and the LEDs (light-emitting diodes) of 14 fuses in Fuse Panels BPP-30 & BPP-36.]*

Mikhail Tyurin then performed the routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables.

Sunita Williams conducted the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Mike L-A completed the standard weekly maintenance of the TVIS (Treadmill with Vibration Isolation & Stabilization), including recording its time & date values. *[Maximum speed in motorized mode is not to exceed 10 mph (16.1 km/h), and SM handrails are in place to protect for tripping.]*

The crew completed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR, FE-2), TVIS treadmill (FE-1), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A copied his, Misha's and Suni's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~11:58am EST, L-A held his weekly PFC (Private Family Conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

The station cabin atmosphere was refreshed with O<sub>2</sub> from Progress M-57/22P oxygen stores for ~1 hr.

For CEO (Crew Earth Observations), investigators had earlier uplinked a long list of geographical coordinates of selected cities for orbital imagery during the next few days.

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Eccentricity -- 0.0023839

Solar Beta Angle -- -40.6 deg (magnitude increasing)

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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3  
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).