National Aeronautics and Space Administration

NASA Advisory Council Task Force
on
International Space Station Operational Readiness

April 17, 2000
NASA Headquarters
Washington, DC

MEETING REPORT

Original signed by

Philip J. Cleary
Executive Secretary

Original signed by

Thomas P. Stafford
Chairman

NASA ADVISORY COUNCIL TASK FORCE ON INTERNATIONAL SPACE STATION OPERATIONAL READINESS

April 17, 2000
NASA Headquarters
Washington, DC

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Lt. General Thomas P. Stafford, USAF (Ret.), welcomed the participants to the open meeting that was convened in order to assess STS-101 flight readiness. This shuttle is scheduled to launch on April 24, 2000.

Mr. Mark Thiessen, Technical Advisor to the Task Force, reviewed the status of the vehicle readiness to date:

Power Drive Unit (PDU) Change Out

During the Rudder Speedbrake (RSB) Frequency Response Test (FRT) on April 5, 2000, the secondary delta pressure readings indicated out-of-tolerance readings of +1200 psia, when nominal psia is +/- 400 psia. Subsequent analyses determined that the problem was most likely internal to the PDU. The PDU in OV104 was replaced with a unit from OV102 during its Orbiter Maintenance Down Period (OMDP). Retesting indicated that the change out was successful. Moog, Inc., manufacturer of the PDU, duplicated the problem on a failed unit and determined that the anomaly was the result of a dislodged spool stop.

The newly installed PDU is scheduled to be cleared at the April 18, 2000, Noon Board pending the failure discussion outcome. This anomaly will not impact the April 24th scheduled launch date. The Space Shuttle Program has no contingency days available in the schedule.

Maj. General Ralph Jacobson, USAF (Ret.), asked if this is the only item that the program office has concerns with prior to launch and Mr. Thiessen answered in the affirmative. Dr. John Fabian asked if the replacement PDU was from the Columbia orbiter and questioned how often parts are taken from vehicles and installed on others. Mr. Thiessen said that the PDU was off of the Columbia. John Young further stated that NASA did use parts from other vehicles if necessary in order to launch vehicles. This was the case with the PDU since the Shuttle Program does not maintain any spares due to cost and unit reliability.

Operations Readiness

Mr. Milt Heflin stated that the power system on the Functional Cargo Block (FGB) requires rehabilitation. He added that: the flight controllers have worked well with the Russians; the U.S. has a very good working knowledge of this system; and, the team is prepared to remove and replace components of the power system. In order to rehabilitate the #1 and #3 string, the battery, charger and controller will be completely changed out; on the #2 string, only the battery and charger will be changed out; and on #5, only the battery will be changed out.

In response to a question about the cause of the failures and capability loss in the power system, Mr. Heflin explained that the batteries have been sitting around for awhile, which lessens their capabilities. Additionally, he believes that there may be a difference of opinion among the contractors as to how the batteries should be operated, e.g. discharging them to full discharge and then recharging them. However, the program office has become increasingly familiar with the system and will be applying lessons learned to mitigate any future problems that may arise before the Service Module (SM) is connected to the stack.

EVA (Extra Vehicular Activity)

Mr. Heflin described the planned EVA. The U.S. crane is not fully seated in the mount and the crew will either remount it in its original location or move it to a new location if necessary. More components will be attached to the Russian crane, Strella, and then that new configuration will be moved to a different location on the stack. Also, the early communications antenna will be changed out and some of the handrails will be repositioned. Mr. Heflin went on to explain that based on experience gained from the Hubble Telescope repair EVAs that lasted from seven to eight hours, estimation of task time in the water versus on orbit has been revised. The program office has added some real time decision-making points toward the end of the EVA whereby they can determine if new tasks should be started or if the EVA should be concluded.

Transfer stowage

With the battery change out, a great deal of activity will take place in the FGB, but Mr. Heflin does not feel that this will impact the stowage transfer. The program office has reviewed the stowage transfer timeline and believes that the crew is well prepared to successfully complete this task.

Training

All training is complete except for one entry and one ascent integrated simulation, both of which will be completed prior to the crew departing for KSC for flight. The EVA crew received six hours of training in the water for every hour on orbit. Mr. Heflin believes this is an appropriate amount of time. Additionally, there were 5 integrated simulations – four of which were conducted with the Russians.

Crew Readiness:

Dr. Andy Thomas stated that the STS-101 crew is ready and there are no major impediments to flight. When the crew was originally assigned, it was a difficult training timeline due to the change in crew so close to launch. This, along with the necessity to reset the crane, caused an additional burden that required more EVA training. He believes that, despite the tight schedule, the crew is well trained for the EVA and ready for flight. Dr. Thomas credited the rapid readiness of the crew to the fact that ISS crew members were assigned to the flight. He explained that these astronauts/cosmonauts have been immersed in the ISS system for years and have an excellent working knowledge of the system. He also believes it is beneficial for the ISS crew to see where they will work and live prior to permanent habitation.

ISS Operations

Maj. General Joe Engle, USAF (Ret.) said that the biggest concern from the ISS ingress standpoint is due to the incident that occurred on mission 2A.1 when crew members experienced headaches and nausea after working behind some of the panels in the FGB. This incident was reported post-flight, so it was difficult to pinpoint the exact cause of the problem. To mitigate this concern and assist with determining the cause, the following procedures are in place:

- The FGB fan will be started 48 hours prior to ingress.
- The Node scrubber will start 2 hours prior to ingress.
- The filter will be changed out.
- Grab samples for post flight analyses will be taken:
  - immediately upon entry.
  - immediately when going behind racks.
  - immediately if symptoms occur.
  - just prior to leaving/closing up racks.
  - just prior to egress.
- Each crewmember will have a CO2 meter (with real time readouts).

Air quality concerns should be alleviated when the SM is added to the stack; thus configuring the circulation system as it was designed.

Gen. Stafford asked if anyone had any questions or comments in regard to the briefings that were presented today. None of the participants had any additional questions or comments, so Gen. Stafford polled the Task Force members as to their agreement that STS-101 is ready to fly. The Task Force was in full agreement. Gen. Stafford said that he would include a statement in the letter to Mr. Goldin that says the Task Force will continue to monitor flight preparations on the vehicle and thanked everyone for their participation in the readiness assessment.

The meeting concluded at 4:45pm Eastern Daylight Time

Attachment A

STS-101 Task Force Open Meeting
Monday 17 Apr 00 – 1500 hrs CDT

1. Assembly and Identification of Participants **Mr. Phil Cleary**
2. Opening remarks and purpose of meeting **Gen. Tom Stafford**
    - Welcome
    - Purpose of meeting to review the readiness of STS-101
3. VEHICLE (PDU change-out) **Mr. Mark Thiessen**
4. OPS READINESS **Mr. Milt Heflin**
    - Flight Control Team
    - FGB/Node
5. CREW READINESS **Dr. Andy Thomas**
    - Flight
    - EVA
6. ISS OPS **Gen. Joe Engle for Craig Fischer**
    - Stack Ingress (air quality concern)
7. CONCLUSION **Gen. Tom Stafford**

Attachment B

NASA Advisory Council
Task Force on International Space Station Operational Readiness

April 17, 2000
NASA Headquarters
Washington, DC

Task Force Membership

Chairman

Lt. Gen. Thomas Stafford, USAF (Ret.)

Members

Col. James Adamson, U.S. Army (Ret.)
Mr. Percy Baynes
Mr. Benjamin Cosgrove
Mr. Joseph Cuzzupoli
Dr. Charles Daniel
Dr. John Fabian
Dr. Craig Fischer
Dr. Michael Greenfield
Mr. J. Milt Heflin
Dr. Daniel Heimerdinger
Maj. Gen. Ralph Jacobson, USAF (Ret.)
Dr. Ronald Merrell
Mr. David Mobley
Dr. Shawn Rahmani
Dr. Andrew Thomas
Captain John Young, USN (Ret.)

Technical Advisors

Maj. Gen. Joe Engle, USAF (Ret.)
Mr. Mark Thiessen

Executive Secretary

Mr. Philip Cleary

Asst. Executive Secretary

Ms. Holly Stevens

Attachment C

NASA ADVISORY COUNCIL TASK FORCE ON INTERNATIONAL SPACE STATION OPERATIONAL READINESS

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Washington, DC

Meeting Attendees

Stafford Task Force Representatives
Lt. Gen. Thomas Stafford, USAF (Ret.) – via teleconference
Col. James Adamson, U.S. Army (Ret.)
Mr. Percy Baynes – via teleconference
Mr. Benjamin Cosgrove – via teleconference
Mr. Joseph Cuzzupoli – via teleconference
Dr. Chuck Daniel – via teleconference
Dr. John Fabian – via teleconference
Mr. J. Milt Heflin - via teleconference
Dr. Daniel Heimerdinger – via teleconference
Maj. Gen. Ralph Jacobson – via teleconference
Dr. Ron Merrell – via teleconference
Mr. David Mobley – via teleconference
Capt. John Young, USN (Ret.) – via teleconference

Stafford Task Force Technical Advisors
Maj. Gen. Joe Engle, USAF (Ret.) – via teleconference
Mr. Mark Thiessen – via teleconference

Task Force Executive Secretary
Mr. Philip Cleary

Task Force Asst. Executive Secretary
Ms. Holly Stevens

Attachment D

ISS INGRESS PROCEDURES

Dr. Craig Fischer

- Basically no change from procedures used on 2A.1

- Start Scrubbers
  - FGB – 48 hours prior to entry (24 to 48 hrs per Flight Rules)
  - Node – 2 hours prior to entry

- Change filter

- More grab samples (post flight analysis only – not real time)

- Immediately upon entry
  - Immediately when going behind racks
  - If symptoms, take grab sample immediately
  - Just prior to leaving/closing up racks
  - Just prior to egress

- Each crewmember will have a CO2 meter (real time readouts)

Attachment E

March 27, 2000

Lieutenant General Thomas P. Stafford
USAF (Ret.)
1006 Cameron Street
Alexandria, VA 22314

Dear General Stafford:

Consistent with the Terms of Reference that established the NASA Advisory Council Task Force on International Space Station (ISS) Operational Readiness, I would like your Task Force to perform a flight readiness assessment of the STS-101 mission relative to ISS activities. This mission is currently planned for an April 17, 2000, launch and is flight 2A.2A in the ISS assembly sequence. As I have done so often in the past, I would like to ask you to bring your Task Force to bear on any safety of flight or other operational issues.

I encourage you to consult with any experts in the field whose participation you feel would be beneficial or necessary to the timely conclusion and success of this important readiness assessment.

I would like to receive your assessment no later than April 7, 2000.

Sincerely,

Original Signed By:

Daniel S. Goldin
Administrator

cc:
M/Mr. J. Rothenberg
JSC/AA/Mr. G. Abbey
NAC/Dr. B. Parkinson

bcc:
I/Schumacher
M-1/Readdy
M-4/Hawes
JSC/MA/Dittemore
JSC/OA/Holloway
JSC/OA/Greene
JSC/OM/Luna