

National Aeronautics and Space Administration

**NASA Advisory Council Task Force
on
International Space Station Operational Readiness**

September 25, 2000
NASA Johnson Space Center
Houston, Texas

MEETING REPORT



Original signed by

Philip Cleary
Executive Secretary

Original signed by

Thomas P. Stafford
Chairman

NASA ADVISORY COUNCIL TASK FORCE ON INTERNATIONAL SPACE STATION
OPERATIONAL READINESS

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Meeting Report

Assembly and Identification of Participants

Mr. Philip Cleary, Task Force (TF) Executive Secretary, welcomed everyone to the International Space Station (ISS) Expedition One Crew Readiness Assessment Open Meeting and identified the participants who were attending the meeting in person or via teleconference.

Opening Remarks

Mr. Cleary explained that the purpose of this meeting is to review the work of the Task Force Working Group on the Expedition One mission. Per the request of NASA Administrator Daniel Goldin and Rosaviakosmos Director Yuri Koptev, the Task Force and Utkin Advisory Expert Council have engaged in a joint understanding and assessment of the International Space Station's readiness to support permanent crew habitation and the Russian and American flight team's preparedness to accomplish the Expedition One mission.

As Co-Chairman of the Stafford Task Force Expedition One Crew Working Group, General Ralph Jacobson, USAF (Ret.), was originally slated to chair the Open Meeting. General Jacobson's plane was delayed and Mr. Cleary read his prepared remarks on the Working Group's activities:

This assessment began last week with our meetings in Russia. Representatives from the Joint Commission met with experts from RSC Energia, GCTC, TsNIIMash, and TSUP.

The meetings focused on several areas: the readiness of the Expedition One crew and MCC-Moscow ground control team; simulator status (including software); flight hardware status; ISS stack stowage; the planned Extravehicular Activity (EVA) for the mission; and flight data file and procedures status. Our work included meeting with the Expedition One crew and getting their perspective on the mission.

The Joint Commission is at Johnson Space Center (JSC) this week to complete this assessment. The meetings this week are focused on NASA's perception of the areas I previously mentioned from our Russia visit, and briefings on specific subjects relative to U.S. activities. In addition, we will meet with the STS-106 (2A.2b) crew tomorrow morning to discuss the ISS status.

In addition to the status and issues related to the Expedition One mission, our agenda has also included topics on more long-range ISS issues such as acoustic improvements, Micrometeoroid Orbital Debris (MMOD) protection, leak rates, and the Treadmill with Vibration Isolation System (TVIS).

Specific items worthy of note are:

1. *Medical Support Group Readiness.* Dr. Merrell joined us in Russia and met with the experts from the Institute of Biomedical Programs (IBMP). Dr. Merrell stated to the Joint Commission that, along with the other medical doctors, the medical protocols are in place and as far as the medical community is concerned, the crew is ready to fly.
 2. *EVA (Solar Array) on STS-106.* The Russians requested the manipulation of the jammed solar array during an EVA performed during STS-106. The NASA flight director considered the request, and after coordination with both U.S. and Russian EVA experts, elected not to direct the astronauts to perform the request. Much debate between the Russian and American teams followed. The Working Group notes that this serves as a lesson learned, highlighting the fact that future decisions must be coordinated to maximize operational efficiency. This coordinated decision-making is particularly important for crew safety and effective assembly and operation of the ISS.
 3. *Battery Failures onboard ISS.* Six PTABs have been replaced in the Functional Cargo Block (FGB) and one in the Service Module (SM) since November 1998. Lifetime operational expectancy is at least five years. The failures are identified as manufacturing problems, rather than design. This is an area of significant concern. Procedures to correct the manufacturing problems have been put in place with the battery manufacturer in Voronezh, Russia. A readily available supply of spares is important to insure continued operation.
- Mr. Benjamin Cosgrove requested clarification of the battery failures. General Engle stated that the terminals were not properly soldered, so the wires heated up and failed. He pointed out that this information came from a U.S. expert that had just received a detailed briefing at the Voronezh manufacturing facility. Dr. Daniel Heimerdinger added that in a situation where there is no solder, the voltage drops and localized heating occurs. New batteries will launch on STS-92, scheduled for October 5, 2000.
4. *ISS Software.* The software to support ISS operations through flight 4A has completed three cycles of integrated testing and is ready to go. A plan is in place to complete the software required to support ISS operations for 5A through UF1.
- Dr. Charles Daniel asked if the Program has resolved the problem with the computer icons. (This was an issue that the Task Force had discussed in meetings earlier in the year.) General Engle stated that he was not aware of the status of that issue, but added that during discussions with the Expedition One crew, that issue was not mentioned as a concern. However, he added that the Working Group did not specifically address that issue with the crew.
5. *Russian and American Segment Trainers.* The Russian and American flight control teams are well trained. The RST and AST are very important to the training of future flight teams. Efforts to improve the integrated systems trainers and integrated segment trainers will significantly improve the quality of crew training and better prepare the crews for flight.

In summary, it is the opinion of the Working Group that the site visits and briefings provided by the Russian and American experts on the ISS and crew preparations were complete and comprehensive. Additionally, our opinion is that the discussions were open and candid.

Consequently, based on our assessment, the Working Group believes that the Expedition One crew will be prepared for its mission and the ISS will be ready to accommodate its first permanent crew.

The Working Group notes that the activities and issues that exist today are being worked and the Working Group is confident that they will be satisfactorily accomplished before Expedition

One's scheduled launch date of October 30, 2000.

The Working Group acknowledges that ISS is a new program and is challenged by the international effort required to succeed. These challenges are expected and the Working Group notes a spirit of cooperation between the two countries.

As the ISS program matures, improvements in training philosophies, documentation and application of lessons learned, and, in particular, communicating requirements and clarifying roles and responsibilities, will be one of management's biggest challenges.

Mr. Cosgrove asked if the acoustic level attenuation problem had been rectified and General Engle said that a joint plan is in place, but that it will be taken care of in an incremental fashion. The Expedition One crew will have hearing protection to begin with and will install blankets to dampen the noise level of some of the equipment. He explained that while the Working Group will receive a detailed briefing from the STS-106 crew tomorrow, that will not be indicative of the acoustic level for upcoming crews since many of the noisier systems were not activated at the time the STS-106 crew was onboard. In regard to the noise generated by the TVIS, there are plans underway to develop second-generation TVIS.

Dr. Heimerdinger asked if the Working Group spoke with the Expedition One Crew about the Portable Computer System (PCS) system, their reaction to the Inspector General report, and the emergency procedures. General Engle stated that at the time the Working Group met with the crew, they were going through emergency procedure training sessions. Training is not complete and they will be making modification and changes to those procedures. They will launch with some selected training to be refreshed and/or completed on orbit. However, there is an impressive onboard training program in place that will accommodate much of the training on the laptops.

Mr. Percy Baynes asked if the crew was working with software under configuration management regarding the integration tests. Dr. Daniel said that all of the Russian and U.S. code is under configuration control and that they are running all their tests at the same revision level.

Dr. Shawn Rahmani asked if there is a formal configuration control file stage verification test. Dr. Daniel stated that there should be a formal test with all the code in the flight configuration running on flight processors with flight procedures before we fly. Dr. Heimerdinger said he believes that those tests are informal, but the Software Working Group has recommended that they have a formal process. General Engle stated that this is a very valid issue and the Software Working Group should take up this issue in a separate telecon and report back to the Task Force. Mr. Baynes said that since this does not impact the Expedition One crew, he agreed to address this via telecon. Mr. Heflin interjected that what the crew is flying with now has seen testing verification and that the Moscow Mission Control Center has done configuration control testing.

Mr. Cleary stated that this constitutes our completed assessment as of this date and asked if anyone had comments or questions about what was discussed. There were no additional comments from the Task Force. In conclusion Mr. Cleary thanked everyone for their participation, and said that after the conclusion of our joint meetings tomorrow, a letter will be sent to NASA Administrator Daniel Goldin, Rosaviakosmos Director Yuri Koptev, and NASA Advisory Council Chairman Brad Parkinson for their consideration.

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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

Dr. David Mobley

Dr. Shawn Rahmani

Dr. Donald 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

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Meeting Attendees

Stafford Task Force Representatives

Col. James Adamson, U.S. Army (Ret.) - via teleconference
Mr. Percy Baynes - via teleconference
Mr. Benjamin Cosgrove - via teleconference
Dr. Charles Daniel - via teleconference
Mr. Milt Heflin - via teleconference
Dr. Daniel Heimerdinger
Dr. Shawn Rahmani – via teleconference
Dr. Don Thomas

Stafford Task Force Technical Advisors

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

Task Force Executive Secretary

Mr. Philip Cleary

Task Force Asst. Executive Secretary

Ms. Holly Stevens