National Aeronautics and Space Administration

International Space Station Advisory Committee

March 16, 2006
NASA Headquarters
Washington, DC

EXPEDITION 13 OPEN MEETING REPORT

Todd F. McIntyre
Executive Secretary

Thomas P. Stafford
Chairman

NASA INTERNATIONAL SPACE STATION ADVISORY COMMITTEE

March 16, 2006
NASA Headquarters
Washington, DC

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MEETING REPORT

Mr. Todd McIntyre, Executive Secretary of the NASA International Space Station (ISS) Advisory Committee (AC), welcomed the participants and called roll. He explained that the Chairman, Lt. Gen. Thomas P. Stafford, USAF (Ret.), was called away on an urgent matter and asked Maj. Gen. Ralph H. "Jake" Jacobson, USAF (Ret.), to preside over the meeting in his stead.

General Jacobson gave the following remarks:
Good afternoon/morning and thank you for participating in the first open meeting of the NASA International Space Station Advisory Committee. I'm pleased General Stafford has asked that I chair this meeting in his absence. Over the past decade, this group operated as a task force to assess the Shuttle-Mir missions and the ISS. We were chartered as a stand-alone committee a few months ago and, while our membership and mission remain basically the same, our name has changed. So, thank you for your continuing assistance and the excellent work product this team consistently generates. I'm going to read the report from the Committee's recent fact-finding trip to Moscow where they met with the Russian Advisory Expert Council on the Expedition 13 mission, and then ask a few questions of members who were on the trip.

As directed by our two Agencies, the NASA International Space Station Advisory Committee (AC) and the Russian Federal Space Agency Advisory Expert Council (AEC) met together as a Joint Commission to review the safety and operational readiness of the International Space Station, the flight readiness of the Expedition 13 and Visiting 10 Crews, and the Russian and U.S. flight control teams' preparedness to accomplish the Expedition 13 mission. Additionally, the AC & AEC reviewed preparations for the Expedition 12 and Visiting 10 Crews' landing and recovery from the landing site, the readiness of Soyuz TMA-8 for launch, and the preparedness of Soyuz TMA-7 for landing.

The AC & AEC Joint Commission finds that:

- *the Expedition 13 Crew and Visiting Crew 10 have successfully completed their training in full and are ready to pass their examinations. Based on the results of their medical examinations, the crew members are considered ready for their mission.*
- *the Russian and U.S. flight control teams are prepared to support the Expedition 13 mission.*
- *the ISS is safe and operationally ready to support the crew for the duration of their mission.*
- *and, all vehicle and operational reviews have been completed to support the safe ascent of the Expedition 13 Crew and Visiting Crew 10 on Soyuz TMA-8, and the safe descent and landing of the Expedition 12 Crew and Visiting Crew 10 aboard Soyuz TMA-7.*

The findings of this report resulted from meetings in Houston, Texas, January 23-25, 2006, where the Joint Commission received briefings on the status of some ISS systems and NASA's efforts to return the Space Shuttle to flight. The Joint Commission also met to receive briefings on the readiness of Expedition 13 in Moscow, Russia, on February 28-March 2, 2006, at TsNIIMash and the Gagarin Cosmonaut Training Center. The briefings in Moscow included the following topics:

Expedition 13 Flight Plan for ISS;
ISS Readiness Status including Elektron and Environmental Control and Life Support Systems (ECLSS);
Expedition 13 EVA Plans;
Medical Operations;
Mission Control Center – Moscow (MCC-M) Readiness;
Mission Control Center - Houston (MCC-H) Readiness;
Soyuz TMA-7 Readiness;
Soyuz TMA-8 Readiness;
Crew Training Status for Expedition 13 and Visiting Crew 10;
Biomedical Training;
Soyuz TMA-8 Crew Training;
Expedition 12 Crew Landing Readiness on Soyuz TMA-7;
Search and Rescue Complex Readiness;
EVA Training;
and, a meeting with the Expedition 13 Crew and Visiting Crew 10.

From these briefings, the Joint Commission produced the following observations and recommendations:

A number of maintenance tasks will be performed on Russian EVA-16. In addition, a commercial golf project is scheduled for this EVA. Russian and American experts are currently considering EVA-16 safety and an appropriate Safety Data Package will be provided following the standard procedure.

A special RSC-Energia commission investigated the anomaly on Soyuz TMA-8 in late December 2005 when a voltage converter failure occurred during electrical testing of the spacecraft at Energia. This analysis revealed that the root cause of the failure was an isolated defect of the converter circuitry assembly. Technical documentation and acceptance testing at the manufacturing site have been updated to make the operational control and acceptance testing more thorough, and all similar devices and units have been re-tested and verified. These measures will exclude the possibility of repeating this failure. The failed Soyuz TMA-8 converter and associated circuitry (that is, the electrical devices and wiring) were replaced, and the integrated system has passed all required tests.

Final processing of Soyuz TMA-8 will be completed at Baikonur. The planned launch of Soyuz TMA-8 is scheduled for March 30, 2006. The Joint Commission believes Soyuz TMA-8 will be ready for launch after final checkout at Baikonur. The Joint Commission also believes that Soyuz TMA-7 is ready to return the Expedition 12 Crew and Visiting Crew 10.

There are no medical constraints for the Expedition 13 mission. The Expedition 13 and Visiting 10 crews have been medically qualified for the space mission and are prepared to

perform medical operations and bio-medical experiments. In addition, all ground medical personnel are fully prepared to support the crew during the Expedition 13 mission. The ISS is safe and operationally ready to support the crew for the duration of their mission.

The Joint Commission has concluded that the Expedition 13 Crew is well trained and ready for their mission. The crew has been trained for their role in the arrival of STS-121 and STS-115. Furthermore, the crew is trained for ISS operations for the entire increment in the presence or absence of the Shuttle missions.

Ground support and search and rescue forces are trained and ready to support this mission. The flight control teams and facilities for both Moscow and Houston are fully coordinated and ready to control and support the flight of Expedition 13.

Finally, the Joint Commission is pleased to note that since the installation of liquid unit #8, the Elektron oxygen supply system is working nominally.

That ends the report.

Now I have a few questions and then I'll open this up to the Committee.

Gen. Jacobson asked Committee member Kathryn Clark, Ph.D., a question regarding the Soyuz anomaly: *I understand you had extensive discussions with our Russian counterparts. Were you satisfied with the explanations and the corrective action that was taken?*

Dr. Clark responded: *Yes, Gen. Jacobson, the Russians are dealing with some of the same issues we have to deal with in our space program. In this case, a new technician assembled a component improperly which led to the system problem after the component was installed in Soyuz TMA-8. We questioned them extensively on this problem and they were very forthcoming and stated that some of their more experienced folks are gone and retiring and that they are experiencing turnover in the industry due to competing technologies. They have gone back and assessed their quality control procedures and improved them and are developing more checks and balances so that newer technicians are getting better training and supervision. In fact, after our discussions, there were some additional procedural changes given to the crew to enhance their ability to handle anomalous conditions. Both agencies are in the process of reviewing and commenting on those changes prior to the Expedition 13 launch.*

Gen. Jacobson next questioned Committee member James Lloyd about the Elektron: *The Elektron has presented problems in the recent past and the Russians have done extensive troubleshooting and component replacement of the Liquid Units. I understand that the crew now uses new procedures for maintenance and start up. Are you confident that these changes have solved the earlier bubble problems?*

Mr. Lloyd responded: *Yes, Sir. As you are aware, Elektron was shutting down because the pump was cavitating due to bubbles forming in the liquid. A combination of a new procedure for removing air bubbles from the water as a step in replenishing the electrolyte in the Elektron, plus the installation of the improved Liquid Unit 8 with a better-designed pump, has resulted in nominal operation of the Elektron. The breathing oxygen function for the ISS has several legs of dissimilar redundancy in addition to the Russian Elektron oxygen generator – including high pressure tanks of gaseous oxygen as well as the Solid Fuel Oxygen Generators (SFOG), a*

canister that produces oxygen through a chemical reaction. Because the SFOGs have limited shelf life and the oxygen stores in tanks dwell at the Station only during the time Progress crafts are docked (the tanks reenter with the Progress), and the fact that these logistics items are above established margins, have prompted the Program to cycle the use of Elektron with these other sources of oxygen. These stores need to be depleted or their availability will be lost. In other words, the ISS Program is operating Elektron periodically as part of a smart strategy for assuring a balanced and available oxygen supply and to continue to confirm its nominal operation.

Gen. Jacobson continued by asking Committee member Lloyd about the scheduled Golf Experiment that will be conducted during the Russian EVA-16 later in July and asked if this experiment was discussed with the Joint Commission.

Mr. Lloyd responded: *Yes, General Jacobson, we were informed of this EVA task at our meeting and the Russian experts provided an interesting discussion of the task and showed us some of the mockups of the hardware that have been designed for the EVA. EVA procedures are being developed and simulations have been run in the neutral buoyancy laboratories in Russia. The Safety Data Packages are being finalized by the Russians and both sides are now working to ensure that this task will be thoroughly reviewed so there will be no compromise to the safety of the Station or crewmembers. We were assured that the appropriate teams are working together and that the necessary information for NASA to confirm the safety of this activity will be completed in a timely manner.*

Committee member Ronald Merrell was asked if there were any issues or discussions regarding the Treadmill with Vibration Isolation System (TVIS), as Gen. Jacobson understood there had been recent in-flight maintenance (IFM).

Dr. Merrell explained that the IFM was completed nominally and the crew had no problems accomplishing that task. He added that TVIS and the other fitness devices are all operating nominally and are ready to support the new Expedition 13 crew.

General Jacobson asked if any of the Committee members had additional questions or comments. There were none.

He then asked if the Committee had any objections to the findings that resulted from the recent fact-finding meetings. There were no objections. Gen. Jacobson stated that, based on the meeting, the full Advisory Committee and Joint Commission concurred with the assessment outlined here today.

Gen. Jacobson concluded the meeting by stating: *This constitutes our completed assessment as of this date. In performing our assessment, the Joint Commission appreciates the full and open discussion of information presented by the subject matter experts. We will continue to follow the mission prior to the anticipated launch of the Expedition 13 Crew and Visiting Crew 10 scheduled to occur no earlier than March 30, 2006. If we should develop any concerns as we proceed toward launch, General Stafford will contact NASA and the Committee members immediately. We wish the crews well and I appreciate your participation.*

Executive Secretary Todd McIntyre expressed his appreciation to the Committee for their hard work on this assessment and the meeting was adjourned at 1:18 p.m.

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Attachment A

ADVISORY COMMITTEE MEMBERSHIP

Chairman

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

Members

Col. James Adamson, U.S. Army (Ret.)
Mr. Percy Baynes
Dr. Kathy Clark
Mr. Benjamin Cosgrove
Mr. Joseph Cuzzupoli
Dr. Charles Daniel
Dr. Craig Fischer
Mr. J. Milt Heflin
Dr. Daniel Heimerdinger
Maj. Gen. Ralph Jacobson, USAF (Ret.)
Mr. Jim Lloyd
Dr. Ronald Merrell
Mr. David Mobley
Dr. Shawn Rahmani
Capt. Wendy Lawrence

Technical Advisors

Maj. Gen. Joe Engle, USAF (Ret.)
Maj. Bob Maiberger, U.S. Army (Ret.)

Executive Secretary

Mr. Todd McIntyre

Asst. Executive Secretary

Ms. Holly Stevens

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Attachment B

MEETING ATTENDEES

Members

Dr. Kathy Clark – via teleconference
Dr. Charles Daniel – via teleconference
Dr. Craig Fischer – via teleconference
Maj. Gen. Ralph Jacobson – via teleconference
Capt. Wendy Lawrence – via teleconference
Mr. Jim Lloyd
Dr. Shawn Rahmani – via teleconference
Dr. Ronald Merrell – via teleconference

Technical Advisors

Maj. Gen. Joe Engle – via teleconference
Maj. Bob Maiberger – via teleconference

Executive Secretary

Mr. Todd McIntyre

Asst. Executive Secretary

Ms. Holly Stevens – via teleconference

NASA

Ms. Rebecca Gilchrist, NASA Headquarters