

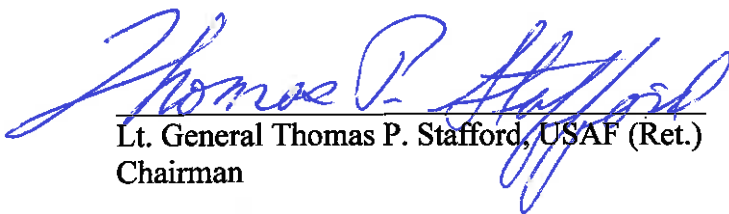
**National Aeronautics and Space Administration**

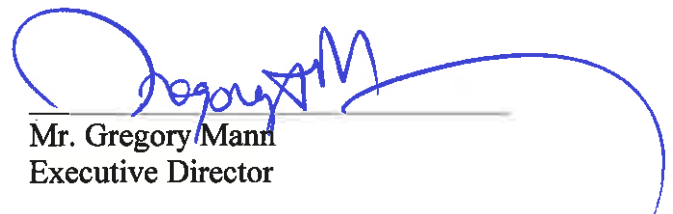
**International Space Station Advisory Committee**

**September 9, 2014  
NASA Headquarters  
Washington, DC**

**OPEN MEETING REPORT**



  
Lt. General Thomas P. Stafford, USAF (Ret.)  
Chairman

  
Mr. Gregory Mann  
Executive Director

# NASA INTERNATIONAL SPACE STATION ADVISORY COMMITTEE

September 9, 2014  
NASA Headquarters  
Washington, DC

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# NASA INTERNATIONAL SPACE STATION ADVISORY COMMITTEE

September 9, 2014  
NASA Headquarters  
Washington, DC

## MEETING REPORT

Mr. Greg Mann, Executive Director of the NASA International Space Station (ISS) Advisory Committee (AC), welcomed the participants, called roll and then gave the floor to Lt. Gen. Thomas P. Stafford, USAF (Ret.), Chairman of the NASA ISS Advisory Committee:

### Opening Remarks:

*General Stafford: Good afternoon and thank you for participating in this open meeting of the NASA International Space Station Advisory Committee. For our meeting today, we will be discussing findings from the recent fact-finding meeting in Korolev, Russia, where the Advisory Committee and the Roscosmos Advisory Expert Council met as the Joint Commission on June 16-20, 2014, for the purpose of continuing to evaluate the viability of the ISS with specific focus on crew safety and utilization issues. Before we begin, however, I would like to take a moment to note that this year marks the 20<sup>th</sup> anniversary of the signing of the Gore-Chernomyrdin joint memorandum on international cooperation in space that established the Shuttle/Mir Task Force, which now known as the ISS AC-AEC Joint Commission.*

*The Joint Commission heard briefings by U.S. and Russian specialists covering a broad range of topics, including joint presentations on the ISS program status and implementation, an update on U.S. On-Orbit Segment visiting vehicles, status of the U.S. Extravehicular Mobility Unit (EMU) anomaly investigation, status of activities in preparation for the one-year mission, medical operations on the ISS, and the U.S. and Russia assessments for extending the life of ISS. Experts from RSC Energia, the Khrunichev Space Center, the Gagarin Cosmonaut Training Center, Mission Control Center-Moscow, TSNIIMASH, and NASA's ISS Program Office participated in these meeting and gave presentations.*

*For this public meeting today, I will summarize each of the main areas that we reviewed, and then allow the Committee members to ask questions and discuss each topic.*

### ISS Program Overview

*The Joint Commission received comprehensive briefings from both the U.S. and the Russian programs on the current status and operations onboard the ISS. The U.S. On-Orbit Segment briefing covered the ISS flight plan, the current Expedition 40 objectives, utilization, and research plans, ISS utilization highlights, consumables status, and a review of pertinent ISS vehicle issues.*

*The briefing detailed the performance of the U.S. On-Orbit Segment and the crew in Expedition 40, and noted that the next crew rotation is planned for September 2014. The ISS Program Office outlined the crew and cargo vehicles flown to the ISS since Nov 2013, which included the*

*Orbital Cygnus 1 and the SpaceX Dragon 3 cargo deliveries, along with the Russian Progress cargo deliveries 53P, 54P, and 55P, in addition to the Soyuz vehicles delivering the 38S and 39S crews to station. The ISS Program Office also briefed the Joint Commission on the three U.S. contingency extravehicular activities (EVAs) executed since November 2013, including the double EVA in December for replacement of a failed pump module, as well as the successful EVA 26, which removed and replaced the External Multiplexer/Demultiplexer-2 that had failed during an attempted Pre-Positioned Load in April 2014.*

*Current statistics on research and utilization for the U.S. On-Orbit Segment were also covered. NASA and Roscosmos Program Managers have now signed a protocol to increase utilization of ISS, and several recent agreements are being implemented, including SPHERES, Zero Robotics, EarthKAM, UBNT+Bar, and IVA clothing, with others in development or under consideration. The ISS Program Office highlighted the 86 new investigations, and updated the number of overall investigations through Expeditions 36, which now totals 1556 investigations.*

*Regarding commercial space, the ISS Program Office briefed the status of the Center for the Advancement of Science in Space (CASIS) Advancing Research Knowledge (ARK-1) research and the commercial cargo flights (SpaceX and Orbital). The commercial crew status was also briefed by the ISS Program Office. The Joint Commission also heard status updates on all of the relevant ISS vehicle issues.*

*The Russian briefing covered primary operations planned for Expedition 40, and highlighted the spacewalk of ISS Russian EVA-38 and EVA-39, the current state of the onboard systems on the Russian segment for the duration of Increment 40, and the two-day rendezvous and docking of the transport manned spacecraft "Soyuz TMA-12M" to the ISS. The Joint Commission was briefed on the status of the Russian telemetry system, which is currently in working order except for one unit (which does not affect the workability of the system), and the Russians are working on plan to deliver a replacement unit. The Joint Commission was also briefed that the Russian Environmental Control and Life Support System has had a problem since June 10, 2014, with burning and smoke noted in one module. The unit has been shut down and dismantled, and a replacement is now in its place, with the Russians working on plan to deliver new unit for spare in orbit (for additional redundancy). The Russians also briefed on the March 2014 anomaly on the Soyuz 4-orbit rendezvous, which resulted in the contingency two-day rendezvous approach.*

*The Joint Commission noted that the U.S. and Russian presentations identified areas of concern in advance of potential failures. The Joint Commission also agreed that both Programs had been very forthcoming, briefing on all of their current problems and anomalies, and observed that those anomalies that had been identified received immediate and carefully-planned responses to allow full operational capability to minimize any safety issues and to maintain redundancy.*

*I will now open up the floor for Committee questions or discussion regarding the ISS Program overview. Are there any questions or discussion?*

*There were no questions or discussion.*

## **ISS U.S. On-Orbit Segment – Visiting Vehicle Status**

*The ISS Program Office briefed the Joint Commission on the status of visiting vehicles to the U.S. On-Orbit Segment. The briefing included mission status reports for SpaceX-4 and -5, Orbital-2 and -3, and the European Space Agency's Automated Transfer Vehicle, or ATV-5. Regarding SpaceX, the Joint Commission had questions regarding the cause of the water intrusion during the SpaceX-3 splashdown, and whether there were any planned design changes or operating procedures from SpaceX to address this issue for future cargo missions. The ISS Program Office also noted a likely delay for the upcoming SpaceX-4.*

*The briefing also included the ISS top program risk matrix. The number one risk continues to be the lack of assured access to ISS (need to ensure necessary available Russian seats). The number two risk concerned constraints on the ISS operations budget. The Joint Commission was also briefed on the consumables resupply status provided by the visiting vehicles and noted that the current consumables levels are acceptable. While the ISS Program has done a good job of managing the manifest to ensure no resupply issues, the Joint Commission observed that there continues to be schedule delays with the U.S. visiting vehicles.*

*I will now open up the floor for Committee questions or discussion regarding the visiting vehicle status. Are there any questions or discussion?*

There were no questions or discussion.

## **Extension of ISS Flight**

*The Joint Commission heard presentations from both the U.S. and Russia programs on the technical assessment of life extension of the ISS. The ISS Program Office presented on U.S. On-Orbit Segment updates occurring since the last Joint Commission briefing in November 2013. Currently the ISS Program Office is proceeding with its assessment of the subset of Phase III Life Extension hardware through 2028 that is considered to be at greatest risk. One finding of the Micro Meteoroid and Orbital Debris assessments to 2023 showed potential for elevated risk due to the incorporation of updated orbital debris model (ORDEM 3.0), which was released in 2013. It was also noted that NASA is working to add the Russian Segment life extension assessment to Certification Baseline Vol. 4, Rev. A, in order to encompass all of the International Partner Segments.*

*The current status of the U.S. On-Orbit Segment Primary Structure has assessed that the FGB primary structure is cleared through 2028, with all Phase I & II hardware also now cleared for 2028, except the P6 IEA (which is cleared for 2020). Tasks are in work to attempt to extend the operational life of the P6 truss Integrated Equipment Assembly beyond 2020. The remaining U.S. On-Orbit Segment hardware is cleared for 2020, based on launch date and a 15-year design life.*

*AEC Executive Director George Karabadzak presented for Roscosmos on the extension of ISS flight until 2020, primarily focused on the programmatic merits versus the technical capabilities*

*of extension to 2020. Roscosmos believes that station will operate until at least 2020, and is planning accordingly. Roscosmos outlined two primary factors impacting the possibility of extending the ISS beyond 2020: the transition to a follow-on joint exploration project, and long-term funding concerns.*

*For Roscosmos, going beyond 2020 will involve a smooth transition to a new project, whether it's exploration of the moon or a flight to Mars or something else. By their projections, this process would take 6-8 years to transition from ISS to other space cooperation projects. The Russian space program is assessing how to make this smooth transition and how – and in what manner – it could be implemented.*

*I will now open up the floor for Committee questions or discussion regarding the status of life extension for the ISS.*

There were no questions or discussion.

### **The Extravehicular Mobility Unit (EMU) - U.S. Space Suit Defects, Investigations, and Status**

*The Joint Commission heard a detailed presentation on the status of the U.S. space suit anomaly, investigation, and mitigation practices. During U.S. extra-vehicular activity (EVA) #23 on 16 July 2013, EV2 experienced a build-up of free water in the EMU helmet. The EVA was terminated at 1:05 with a final Phase Elapsed Time of ~ 1.5 hours. During translation to the Airlock, water migrated to EV2's face covering his eyes, ears and nose. This accumulation of water resulted in EV2's communications and vision being degraded.*

*The Crew report of ~1.5 liters of water in the helmet at helmet doffing was confirmed by the Post-EVA water recharge of the EMU feed water tanks. Post-EVA, the crew reported the water was very cold indicating that it came from the EMU cooling loop, not the in-suit drink bag. An expedited suit doffing was performed, removing EV2's helmet at 1:41 PET. The failure was well in excess of previous water in helmet experience, which in the past has manifested as streaks or "rain" on the visor, not as a significant amount (volume) of water in the helmet.*

*EV2 was using EMU suit number 3011, which was launched to ISS on STS-132 (May 2010). EMU 3011 had been used on 5 EVAs prior to U.S. EVA 23. Silica-based contaminants blocking the fan pump water separator drum holes were confirmed to be the cause of the water carryover. Premature saturation of the Airlock Cooling Loop Recovery ion bed was believed to be the cause for the silica contaminants.*

*Initial findings indicate a number of potential practices and/or system configurations that could lead to poor quality water use for EMU ion bed processing. The management of the ground facility DI water system allowed for unacceptable levels of contaminants to be released towards the end of the DI bed's life and passed to the EMU ion bed hardware during processing.*

*During the investigation, a fault tree was developed that contained 44 possible failures and/or events. Analysis of returned hardware and water samples pointed to the Airlock Cooling Loop Recovery ion exchange beds as a primary source of excessive silica. A broad approach has been taken to tighten up quality controls for certain aspects of EMU processing. New processes have*

*been put in place (charcoal cleansing/rinse plus continuous monitoring of water quality) to produce clean ion exchange beds. Hardware has been replaced with cleaned and processed components.*

*At the time of this meeting, the investigation was ongoing including a thorough review of procedures and preparation, and the ISS Program Office was not ready to declare its readiness to return to planned EVA capability. However, confidence in understanding the cause and response to the problem was sufficient to respond to an emergency or contingency EVA requirement. In fact, three contingency EVAs have been performed since US EVA #23 to remove and replace a failed Pump Module (U.S. EVA #24 and #25), and to remove and replace a failed External (EXT) Multiplexer/Demultiplexer-2 (U.S. EVA #26).*

*The Joint Commission acknowledges the efforts of all involved in this effort and encourages the ISS Program Office continue to focus on the issue of water quality to ensure continued EVA capabilities, along with all other ISS systems that are dependent on water quality.*

*I will now open up the floor for Committee questions or discussion regarding the issue of water in the EMU helmet.*

There were no questions or discussion.

### **Status of ISS Russian Segment Certification – Extension of FGB Zarya Service Life**

*The Joint Commission heard a presentation from AEC member Sergey Shaevich on the status of work performed for the Functional Cargo Block (FGB) “Zarya” service life extension until 2020 and 2028, the modernization and replacement of FGB onboard equipment, and the development of specialized test and diagnostic equipment for systems that are not able to be replaced. Shaevich also reviewed the question of FGB Propulsion Plant propellant transfer in conditions of FGB depressurization. He noted that all work for extension to 2020 is complete, and that Khrunichev is also completing work on extension of the FGB to 2028. Mr. Shaevich also outlined the work completed under the Phase IIIA contract, and updated the status of the work being provided under the contract with Boeing.*

*In the briefing, Shaevich also noted that among the non-replaceable parts are the Micro Meteoroid and Orbital Debris (MMOD) shields, but stated that Khrunichev has certified these existing MMOD shields (using manufactured analogues on ground, artificially aged to be certify them to 2028). Additional calculations were performed on the degree of protection the MMOD shields are providing, and non-penetration calculations on these were changed as a result of the tests, so Khrunichev has now certified that the MMOD shields are safe until 2028.*

*Mr. Shaevich presented three conclusions regarding the life extension of the FGB until 2020 and 2028:*

- 1. The works on extension of FGB “Zarya” non-replaced equipment service life until 2020 and 2028 have been completed with positive results;*

2. *Make-up and delivery terms have been defined for non-replaceable equipment that requires modernization and cannot be manufactured against the existing design documentation; and*
3. *There are known problems related to the support of the FGB functionality in a depressurization contingency situation. The preliminary results on thermal-physical properties will be presented in December 2014.*

*I will now open up the floor for Committee questions or discussion regarding extension of FGB Zarya service life.*

There were no questions or discussion.

### **Status of Preparation for One-Year Mission – U.S. and Russian Programs**

*The Joint Commission first heard a presentation from the U.S. On-Orbit Segment, prefaced with the statement that much of the material presented was drawn from the charts from Dr. Bogomolov and Dr. Schmid. A primary justification for the One-Year mission is that the ISS Program Office has a lot of 6-month data points, but are looking for the one-year mission to provide a lot of 12-month data points to complement this data. The Multilateral Human Research Panel for Exploration International Fly-off Plan are working with an earlier version of a 2012 strategic white paper (“Enhancing ISS Human Research, An International Strategy of Risk Reduction for Exploration”) to develop an International Path to Risk Reduction. One of the keys to this international coordination is the sharing of collected data, with general agreement between the International Partners performing this exploration risk-reduction human research on ISS and associated non-flight analogs.*

*A data-sharing agreement template and guidance was completed in April 2014 and has been distributed to the one-year mission investigator teams, and data-sharing principles are expected to be signed soon. In addition, the data management infrastructure is in the requirements definition phase, with a plan to leverage the Multilateral Medical Operations Panel clinical data collection system for efficiency.*

*For the one-year mission increment science planning efforts, the biomedical science program for ISS 43/46 expeditions has been developed in accordance with NASA/Roscosmos one-year mission (planned to launch in March 2015). The Russian part of the program consists of ten in-flight experiments dedicated to space medicine and physiology, and it is planned that the American astronaut will participate in three of the Russian experiments (Pilot-T, Vzaimodeystvie-2, and Kontent). The NASA part of the program consists of eight experiments planned for the 42S Russian and U.S. one-year mission crewmembers, all of which include pre-, in- and post-flight tests.*

*The Russian and U.S. one-year mission crewmembers will also perform the two joint U.S./Russian protocols, the three Russian investigations, and data sharing for ten investigations from Russia, eight investigations from NASA, and other ESA and JAXA experiments. These investigations will include: joint investigations (led by collaborating investigators from both Roscosmos and NASA, with both Roscosmos and U.S. On-Orbit Segment crewmembers as subjects); cross-participation investigations (led by one or the other partner, with both*

*Roscosmos and U.S. On-Orbit Segment crewmembers as subjects); and data exchanges (data is shared between agencies, but remains part of each agency's national program without cross-participation).*

*The one-year mission follow-on plans are still being developed, but will include a research focus, an operations implementation strategy, a research implementation strategy, and potentially some new in-flight monitoring equipment. Elements of the research focus include medical events, physiological deconditioning, and behavior and performance standards and countermeasures. The operations implementation strategy will include a baseline mission duration of six months, with expectations for five-to-six future one-year missions. Elements of the research implementation strategy include a fully-integrated joint U.S.-Russian research program and a planned three-tier research plan.*

*The goal of the one-year mission is to better understand how the human body reacts and adapts to the environment of space. Data from the one-year mission will help advance current assessments of crew performance and health, and this data will be used to demonstrate and evaluate countermeasures to reduce the risks associated with future exploration. During the uninterrupted permanent human presence aboard the ISS, scientists and researchers have gained valuable, and often revealing data on the effects of microgravity on bone density, muscle mass, strength, vision and other aspects of human physiology; the one-year mission will allow for greater analysis of these effects and trends.*

*The Joint Commission also heard a presentation on the one-year mission from the Russian program. A question was raised regarding similarity of sleeping arrangements, training, exercise equip, etc., for the two astronauts on the one-year mission, in order to yield an ideal data set.*

*The Joint Commission had questions regarding the physical and psychological health of the astronauts in preparation for one-year mission, and inquired as to whether all of the medical info and lessons learned from the earlier, long-term Russian cosmonaut flights on MIR had been fully shared with the U.S. medical team. The Russians noted that all of the training data is available at the Gagarin Cosmonaut Training Center, and that all the flight phase data is captured and saved at the Institute for Biomedical Problems. The Joint Commission was in agreement that the Russians currently share all of their medical data with the U.S., but it was unclear if the U.S. medical team had sought and received the earlier medical data.*

*The Joint Commission looks forward to hearing more on the planning and progress for the one-year mission at its next meeting in Houston, and on whether any decisions have been made for future long-term increments on the ISS.*

*I will now open up the floor for Committee questions or discussion regarding the one-year mission.*

There were no questions or discussion.

## **Soyuz 38S – Causes for Rendezvous Program Transition from 4 orbits to 36 orbits**

*The Russians also provided a detailed description of the Soyuz 38S (TMA-12M) transition from the 4-orbit rendezvous, and the analysis of its cause. The Joint Commission was presented findings that a software patch has been made that should preclude this scenario from recurring. The most important issue with the rendezvous program transition is that if anything wrong happens and a similar scenario occurs, the crew safety is assured via the transition to the 36-orbit scenario, which remains a safe fallback option. This is consistent with all of the earlier planning discussions in support of the 4-orbit scenario, where all parties agreed on the need to be able to revert to the 2-day scenario in an off-nominal scenario, as demonstrated with the Soyuz 38S (TMA-12M) transition.*

*I will now open up the floor for Committee questions or discussion regarding the transition from 4 orbits to 36 orbits.*

Col. Kevin Ford, USAF (Ret.), stated that the actual orbit scenario calls for 34 orbits and not 36.

## **Medical operations on the ISS – U.S. and Russian Programs**

*The Joint Commission heard a summary of the recent ISS missions, along with an overview of the current and upcoming missions. Topics covered included the medical operation carried out between ISS 37-41, the quality of the air and the water supply systems, radiation monitoring, the use of exercise equipment, and the landing of ISS 37/38 and the ISS 38/39 crews. Given the current and future collaboration planned for in-flight biomedical investigations, the Joint Commission proposed that ISS Program Managers consider:*

- *Definitions of joint work to resolve questions of participation of ISS crewmembers, allocation of crewmember time, and allocation of resources for ground specialists required for implementation of in-flight work;*
- *Documentation to inform all ISS Program organizations about this work, and to authorize those organizations to implement this work; and*
- *Provisions to certify U.S. On-Orbit Segment equipment for use in the Russian Segment of the ISS and vice versa, according to previously-established requirements and without excessive delay.*

*The Joint Commission noted that the current medical processes of the Partners appear to be effective in maintaining the health and performance of ISS crews for the flight programs. The Joint Commission also supports the cooperative research initiatives of the Multilateral Human Research Panel for Exploration biomedical programs of the ISS partners to study the nature and prophylaxis of critical risks of human flight beyond low-Earth orbit, including joint one-year studies.*

*I will now open up the floor for Committee questions or discussion regarding medical operations on the ISS.*

There were no questions or discussion.

## **Biomedical Research Implementation Program Planned for 1-Year Mission**

*The Joint Commission first heard a presentation from Dr. Bogomolov, representing the Russian medical community, primarily focused on the one-year mission and the one-year increment joint science planning efforts. Dr. Bogomolov outlined the current coordination efforts underway between U.S. and Russian investigations, including the:*

- *Joint investigations featuring collaborating Principal Investigators from both Roscosmos and NASA;*
- *Cross-Participating Investigations, which are led by either NASA or Roscosmos, but with crewmembers from both sides participating; and*
- *Data Exchange experiments that are led by one side or the other, but involving data that is shared between NASA and Roscosmos.*

*Dr. Bogomolov also described to the Joint Commission some of the current problems and issues, including the inflight biomedical investigations that require agreement on multiple items, the oversubscription of the program for biomedical research for the one-year increment, and the need for ISS crewmembers on Expeditions 43-44 and 45-46 to function as operators and safety monitors for these investigations. Dr. Bogomolov also noted that although the Russian and American crew members have been flying together for 15 years, the two medical communities use very different datasets and approaches to medical countermeasures; it would be very useful to work together and compare these approaches.*

*For these early, long-term missions, the Russians had the idea of gradually increasing the flight times on Mir in order to investigate the adaptability of human beings to space flight. These missions went from durations of 180 days, 185, 211, 11 months, 12 months, and finally 438 days, with the aim of learning the capabilities of crew members to adapt to space flight. In doing so, the Russians were able to address two primary questions: whether a system of countermeasures developed to cope with these negative consequences would be successful, and whether a man would be capable of working for such a long under space conditions and then going back to Earth and being in a functional state.*

*In addition, Dr. Bogomolov was able to update the Joint Commission regarding the sharing of prior Russian research on long-duration missions with the cosmonauts. He explained that the one-year MIR flight data had been summarized in a monograph that had been published, as well as a Russian-U.S. vol. 5 that characterized all of the data obtained on these long-term flights. Dr. Bogomolov also noted that there is a special Russian-American working group on space medicine that submits all of the data that they are requested to submit. Finally, he noted that for the Mir-NASA shuttle program, the data from these joint experiments had been shared with the Americans.*

*The Joint Commission also heard a presentation from Dr. Ron Merrell, with support from charts from Dr. Joe Schmid. Much of the information presented aligns with the presentation by Dr. Bogomolov, but a few additional items of interest were raised. Despite being in a 22-year solar max, ISS crew members have been very fortunate regarding their exposure to space weather. The radiation exposure rate (~24 mrad/day at Altitude: ~415 km for 39S Stage) is not problematic, and at no time have any crew members been asked or required to go into "sanctuary".*

*In terms of acoustics assessment, mitigation efforts have brought the noise down to acceptable levels and the situation is improving in terms of short-term exposure. The noise levels in Russian segment are above requirements but present a low risk for permanent hearing damage, and while the Russian segment has had some difficulty with permanent segment shifts, a complete resolution appears to be achievable through the use of different motors and such.*

*The environmental habitability of the ISS has had some issues in the past with getting data back in a timely manner, but the situation has improved and the current results are satisfactory. In terms of microbiology operations, the air, surface, and water analyses indicate that levels and types of microorganisms recovered in the U. S. segment pose little or no threat to crew health, the ISS environment, or systems performance.*

*For the ISS food system, the total caloric requirements are currently being satisfied, though certain food categories are lower than desired due to delays in commercial resupply flights.*

*In terms of the one-year mission, the Joint Commission understands that both crewmembers have received informed consent briefings for each of the protocols presented as part of the briefing. However, consent forms will not be signed until the NASA Johnson Space Center (JSC) Institutional Review Board (IRB) approval for the full complement is received. A further consent briefing will likely be scheduled for Scott Kelly in the summer of 2014 to present the one-year mission twin studies protocols, with additional individual protocols to be submitted to the IRB before the consent briefing is to take place. A final update of this complement will be submitted to the JSC IRB this summer, to include any twin studies protocols, and the full complement update will include a final projected post-flight schedule and inflight blood draw tables.*

*Based on these presentations, the Joint Commission concluded that from a human health and performance standpoint, the ISS remains a habitable and viable microgravity laboratory. Future expected developments include increased commercial vehicles – resulting in increased payload capability and sample return capacity – and a one-year mission U.S. crewmember with an identical twin to serve as his control, which will test exercise countermeasure effectiveness, human behavior, and performance and ground teams support effectiveness.*

*The Joint Commission questioned whether the program for biomedical research for the one-year mission was over-subscribed, and asked if it needed to be curtailed based on priorities. The Joint Commission also suggested that any investigation that does not receive informed consent by designated crewmembers should be removed from consideration from one-year missions. The ISS crewmembers on the 6-month Increments 43-44 and 45-46 should be required to function as operators and medical safety monitors for planned biomedical investigations on the one-year mission, and as subjects for other biomedical investigations on those and other increments. The Joint Commission also raised the prospect of additional one-year flights from 2017-2020 to augment the research data.*

*I will now open up the floor for Committee questions or discussion regarding the biomedical research program planned for the one-year mission.*

There were no questions or discussion.

## **Conclusion**

*Once again, the Joint Commission commends the ISS Program and the International Partners for the continued successful operation of the ISS and for maintaining an international crew of six with the existing flight vehicle assets. The Joint Commission also stresses that continued vigilance is necessary to maintain safe and productive operations of the space station.*

*The Joint Commission has made tentative plans to meet again at the Johnson Space Center in November 2014 for another fact-finding meeting on ISS safety and utilization issues.*

*This concludes the current report and summarizes the work accomplished by the Working Group during the recent fact-finding meetings in Moscow. Given this report, do any Advisory Committee members have any final questions or comments?*

There were no final questions or comments.

*Do the Committee members have any objections to the conclusions and findings of this report?*

There were no objections.

*Very well then, based on the recent fact-finding meeting in Moscow and our discussions here today, the ISS Advisory Committee concurs with the assessment outlined here.*

*Thank you all again for the expertise you bring to our Committee. Now, I'll turn this over to the Executive Director to wrap things up. Greg.*

## **Closing:**

**Greg Mann:** *Thanks again for all of your hard work on this assessment. I look forward to your participation at future meetings. We have begun tentatively planning for our next meeting in Houston on November 17-21, 2014. I look forward to see all of you, and our Russian counterparts, at JSC in a couple months.*

*This meeting is adjourned at 1:57pm.*

**NASA INTERNATIONAL SPACE STATION ADVISORY COMMITTEE**

September 9, 2014  
NASA Headquarters  
Washington, DC

**ADVISORY COMMITTEE MEMBERSHIP**

**Chairman**

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

**Members**

Col. James Adamson, U.S. Army (Ret.)

Mr. Hal Bell

Mr. Joseph Cuzzupoli

Dr. Charles Daniel

Dr. Daniel Heimerdinger

Dr. Ronald Merrell

Dr. Josef Schmid

Col. Kevin Ford, USAF (Ret.)

**Technical Advisors**

Maj. Gen. Joe Engle, USAF (Ret.)

Maj. Bob Maiberger, U.S. Army (Ret.)

**Executive Director**

Mr. Greg Mann

**Asst. Executive Director**

Ms. Holly Stevens

**NASA International Space Station Advisory Committee Meeting**  
NASA Headquarters  
Washington, DC  
September 9, 2014

**Members Participating**

**NASA International Space Station Advisory Committee** *(via telecon unless otherwise noted)*

Gen. Thomas P. Stafford  
Mr. Jim Adamson  
Mr. Joe Cuzzupoli

Dr. Dan Heimerdinger  
Mr. Chuck Daniel  
Mr. Harold Bell

**Executive Director**

Mr. Gregory Mann  
Ms. Holly Stevens *(via telecon)*

**Technical Advisers**

Gen. Joe Engle *(via telecon)*  
Mr. Robert Maiberger *(via telecon)*

**NASA Attendees** *(in person)*

Mr. William Gerstenmaier (AA, HEOMD)  
Mr. Sam Scimemi (HEOMD)

Mr. Al Sofge (OIIR)  
Ms. Meredith McKay (OIIR)

**NASA Attendees** *(via telecon)*

Mr. Ven Feng (ISS Program)  
Mr. Ralph Grau (ISS Program)

Mr. Michael Suffredini (ISS Program)

**Media** *(via telecon)*

James Dean  
Florida Today

Stephen Clark  
Spaceflight Now

Marcia Smith  
SpacePolicyOnline.com

Irene Klotz  
Reuters

Jeff Foust  
SpaceNews

**Congressional**

*n/a (request from Jared Stout House Science Subcommittee staffer)*

**Industry**

Alan Keisner  
Space Exploration Technologies, Inc.

Kate Kronmiller  
Orbital Sciences Corporation

James Munger  
Northrop Grumman Aerospace Systems

**General Public**

Micheline Tabache  
European Space Agency (ESA)

Michael Foale (*via telecon*)

William Readdy (*via telecon*)