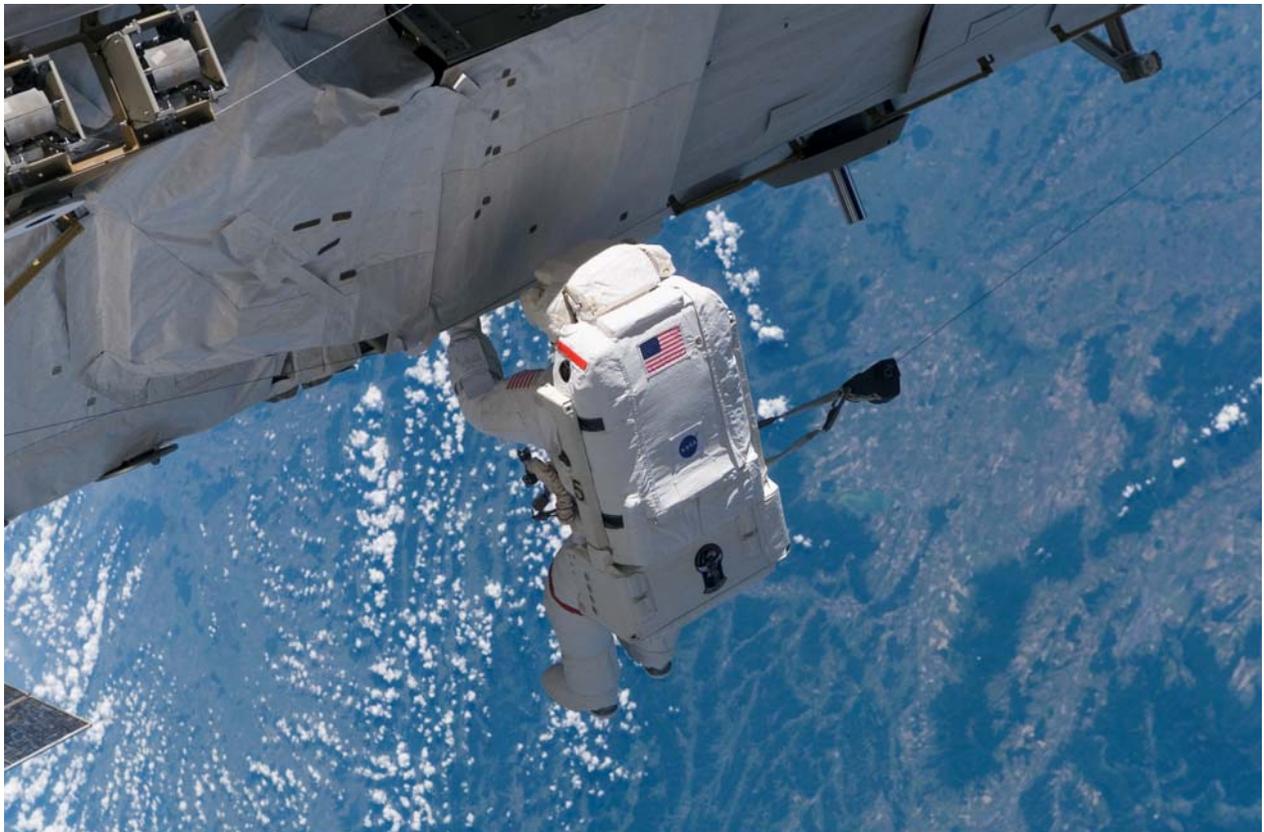


Human Spaceflight (HSF) Network Support Group (NSG) Meeting

September 25 – 28, 2006



S115E05532

STS-115: Astronaut Tanner translates along the station hardware during P3/P4 truss installation.

**Human Spaceflight (HSF)
Network Support Group (NSG)**

Johnson Space Center (JSC), TX

A handwritten signature in black ink that reads "James A. Bangerter". The signature is written in a cursive style and is positioned above a thin horizontal line.

James A. Bangerter
Human Spaceflight Network Director
Goddard Space Flight Center

Network Support Group Attendance

The following attendees participated in all or part of the September 25 – 28, 2006 NSG.

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NSG Minutes

INTRODUCTION

Mr. James A. Bangerter convened the September 28, 2006 Human Spaceflight (HSF) Network Support Group (NSG) meeting to discuss requirements, planning, and issues in support of the Space Shuttle and International Space Station (ISS). Mr. Bangerter welcomed the attendees and thanked them for their attendance at the NSG. He noted that the week had been very productive so far and the NSG main forum agenda is a very busy agenda. Mr. Bangerter stated that the HSF Program and the Integrated Network need the support of all the elements.

Mr. Bangerter asked that the attendees take the time to sign four photographs that will be provided to four persons retiring or moving on from Human Spaceflight support. Mr. Bangerter thanked Ms. Lesley Rahman for her efforts in organizing the NSG, as she took over for Mr. Bruce Schneck who has moved on to another position. Mr. Bangerter thanked Ms. Melissa Boudreaux who helped to coordinate all elements of the NSG (hotels, rooms, social, etc.). Mr. Bangerter thanked Mr. Steven Testoff for his work in coordinating the NSG and writing minutes for the main forum and splinter sessions and Mr. Mike Booth for his work writing minutes for the splinter sessions. Mr. Bangerter offered a special thank you to Ms. Rebecca Marsh for her tireless efforts to find meeting space for the NSG. The NSG had been scheduled to be held at the Regents Park building and was bumped as the Constellation Project took over the building and then was scheduled to be held in a new facility, but was that facility could not be ready in time.

HSF ACTION ITEM STATUS

Ms. Cheryl Smith provided a status of the HSF action items (refer to the presentation, *Human Spaceflight Action Item Status [as of 09/28/06]*). During the last NSG, four action items were assigned and all four are closed (inputs for the Radio Frequency Interference Management Manual [RFIMM], inputs for the Network Services Assurance Plan [NSAP] Technology Refresh [NTR] transition and test plan, Range/Air Force Meteorological Interactive Data Distribution System [MIDDS] involvement, and the 24-hour to 8-hour freeze plan change). Several splinter sessions were conducted and action items assigned and closed:

- Eastern Range (ER)/Johnson Space Center (JSC) NAV: 2 actions assigned/2 closed.
- STS-115 Mission Planning: 1 action assigned/1 closed.
- Goddard Space Flight Center (GSFC) Bypass: 2 actions assigned/2 closed.
- Air Force Satellite Control Network (AFSCN) to the Center for Research Support (CERES) Transition: 6 actions assigned/1 closed (note-work is on hold pending decisions on the National Aeronautics and Space Administration (NASA) mission support move).
- NTR Transition: 5 actions assigned/2 closed (refer the note for the AFSCN).
- STS-121 Mission Planning: 7 actions assigned/6 closed.
- Wallops 9-meter to 11-meter antenna Transition: 6 actions assigned/4 closed.

Ms. Smith stated that two action items remain open from the April 2006 Very High Frequency (VHF) teleconference. The action item from the ISS Critical Activities Meeting in April 2006 has been extended. Two action items from the May 2006 VHF Engineering Meeting remain open. Ms. Lesley Rahman commented that there have been no comments on the Test Plan to date. Mr. Fred Pifer stated that he would contact Mr. Dick Nafzger regarding the test plan. One action item remains open from the

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White Sands Missile Range (WSMR) T-1 Conversion Meeting held in July 2006. Ms. Rahman commented that permission has been granted to move a portion of that link. One action item remains open from the July 2006 STS-121 Lessons Learned Meeting. Ms. Rahman stated that communications was much improved on this last mission than the previous mission. She stated that the action item should be CLOSED. Five action items remain open from the July 2006 Backup Control Team Center (BCTC) Meeting. Two action items remain open from the STS-121 AFSCN Lessons Learned Meeting held in August 2006. Mr. John Hankinson was added to the Carl Boney action item. Two action items remain open from the Wallops 11M Antenna Status Meeting held in January 2006.

Ms. Smith stated in closing, that the GSFC/HSF Rolling Action Item List (RAIL) is distributed every week. Assignees are asked to respond promptly. Ms. Melissa Moore is the GSFC/HSF RAIL coordinator.

HSF DOCUMENTATION STATUS/PLAN

Ms. Cheryl Smith provided an HSF documentation status (refer to the presentation, *Human Spaceflight Documentation Status/Plan and HSF Mission Documentation report*). Ms. Smith reviewed document changes since the last NSG. The *Network Operations Support for the Space Shuttle Program, 450-NOSP-Space Shuttle* was updated via Documentation Change Notice (DCN) 003. The *Network Operations Directive for Human Space Flight Network Support, 450-NOD/HS* was revised (Revision 2). The *Human Space Flight Program Emergency Mission Control Center Activation and Operations Procedures, 450-CAP-EMCC* and the *Human Space Flight Program Emergency Mission Control Center Telephone Reference List, Supplement to 450-CAP-EMCC, 450-CAP-EMCC/Supplement* were revised (Revision 2). The *Very-high Frequency Voice Communications Support Annex to the Tracking and Data Relay Satellite System Network Operations Support Plan for the International Space Station (ISS), 450-TNOSP-ISS, VHF Annex* was published. The *Tracking and Data Relay Satellite System (TDRSS) Network Operations Support Plan for the International Space Station, 450-602/ISS* is being rewritten. Ms. Smith reviewed the documentation plan, which lists the current version, any current activity and schedule, and the book manager. The plan also shows the documents that will be the focus for update during the next Fiscal Year (FY). Mr. Earl Daniel is the Point-of-Contact (POC) for HSF documentation. Mr. Bangerter asked if any updates are critical for the next launch. Ms. Rahman stated that should Santiago (AGO) become a requirement, then the documentation will be updated. The documents will also have to be updated for the 11-meter antenna and Aeronautical Tracking Facility (ATF)-3 support. Mr. Bangerter noted that the GSFC Configuration Control Board (CCB) will be reviewing the JSC 11534, Volume XVI. Mr. Daniel coordinates and reviews the technical documents and Mr. Testoff coordinates the GSFC HSF CCB activity.

NSG SPLINTER SESSION SUMMARIES

NSG splinter meeting Chairpersons provided the following splinter session summaries.

- A. Mission Control Center (MCC) Operational Communications Interface Control Document (ICD), JSC-11534 Review (refer to the presentation, *Splinter Group Meetings*). Mr. Dave Theriault stated that the purpose of the meeting was to finalize the updates to Volumes XV and XVI and initiate new updates to Volume I. Volume XVI will be submitted to the CCB. Space Network (SN) redlines will be incorporated. Volume XV Kennedy Space Center (KSC) redlines

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are expected the week of the NSG. The document is scheduled to be released in October 2006. The scope of Volume I will be changed to Space Shuttle Program (SSP) only. The Automated Transfer Vehicle (ATV) and H-II Transfer vehicle (HTV) will be covered in another volume. Mr. Bangerter will coordinate having Volume XVI submitted to the GSFC CCB. Mr. Earl Daniel will provide GSFC Volume I changes to the Document Manager by October 31, 2006.

- B. Count Down Timing (CDT) Modifications (refer to the presentation, *Splinter Group Meetings*). Mr. Theriault stated that the purpose of this meeting was to review corrective action proposals for KSC and SN trouble tickets and assess potential modifications to the CDT timing from KSC to JSC and the Marshall Space Flight Center (MSFC) during Space Shuttle launch counts. During the STS-121 support count, CDT from KSC to JSC was lost. The KSC modem failed and the NASA Integrated Services Network (NISN) spare was incompatible. KSC has a workaround. The KSC Launch Control Center (LCC) CDT converters are Non-Maintainable Equipment (NME). Mr. Theriault reviewed the Action Plan which has two phases. Phase 1 is a short-term fix. The NISN modems will be tested at both JSC and KSC. If the test is a failure, the JSC CASRS Unit will be shipped to KSC and tested. This effort needs to be tracked in the weekly Comm Working Group. Phase 2 is the long-term fix. Convert the CDT from non-supported Inter-Range Instrumentation Group (IRIG) 109-64 to the newer Standard IRIG-CS5. This removes the need for the 9600-baud Async service modems; removes NME at KSC, and fits into the current MSFC timing modifications. Three action items were assigned. Mr. Bangerter stated that a team should be formed to work the CDT effort. Mr. Gary Morse was given an action item to determine the CDT Project Lead (this person needs to be a KSC individual) (action item NSG-0906-01). The team should include team members from the affected sites. Mr. Mike Allen accepted an action item to determine the involved sites and determine the POCs at the involved sites to participate on the CDT Modification Team (the first POC is Dave Theriault at JSC) (action item NSG-0906-02).
- C. Air-to-Ground (A/G) Comm Issues (refer to the presentation, *Air-to-Ground Issues*). Ms. Pat Mattingly stated that the purpose of the meeting was to define monitor feed of the A/G to the Merritt Island Launch Annex (MILA), define A/Gs during prelaunch and ascent, and update A/G drawings. The meeting grew out of the fact that MILA could not receive A/G 2 after launch. The A/G requirements in both the Launch & Landing and the flight Program Requirements Document (PRD) were redlined. Eight requirements were deleted. Two lines between KSC Communications Distribution and Switching Center (CD&SC) and MILA were freed up. The A/G drawings for the Network Operations Support Plan (NOSP) and NASCOP were updated. Mr. Tony Williams will provide the new drawings to Mr. Daniel. Two action items were assigned.
- D. NTR Status Meeting (refer to the presentation, *NTR Splinter Group Meetings*). Ms. Michele Mascari stated that the purpose of the meeting was to present the current status of the NTR project. The NTR backbone implementation is 95 complete. The Quality of Service (QoS) implementation is in progress. Installation of the master timing module was initiated at GSFC on September 25, 2006. The target date for initiating NTR transition is October 9, 2006. If there are problems with the transition, report to the Comm Mgr. The customer reporting the problem must include the service ID and network (NSAP or NTR).

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- E. NTR Testing Meeting (refer to the presentation, *NTR Splinter Group Meetings*). Ms. Michele Mascari stated that the purpose of the meeting was to describe the testing approach and phases of testing for NTR. Each testing phase (Node Acceptance, Service Acceptance, and Network Operations) and the site support required for each was described. A node is defined as an entire site. A Mission Comm Mgr has been assigned to act as lead during the transition.
- F. NTR Site Meetings. (refer to the presentation, *NTR Splinter Group Meetings*). Ms. Michele Mascari stated that the purpose of the meetings was to discuss the detailed transition schedule between 'now' and the Terminal Countdown Demonstration Test (TCDT). The transition approach was discussed; site concurrence on the current schedule was obtained; a time to fall back was identified; and the NTR Transition Coordination package was discussed. Mr. Bob Marriott stated that when the Internet Protocol Operational Network (IONet) is ready to be tested, the dates need to be finalized so that the Flight Control Team can be informed. Ms. Mascari stated that those dates are identified in the schedule. Mr. Theriault stated that the Internet Protocol Network Operations Center (IPNOC) failover times and site failover times need to be identified. Ms. Mascari stated that the IPNOC was conducting testing the week of the NSG.
- G. NASCOP Review (refer to the presentation, *NASCOP Review*). Ms. Michele Mascari stated that the purpose of the meeting was to disposition comments to the NASCOP submitted by the Jet Propulsion Laboratory (JPL) and JSC. The document will be submitted to the NISN CCB prior the Mission Communications Working Group (MCWG). It was determined that several sections of the document contain information that is also in the NOSP and TNOSP. The document will be reviewed and redundant information removed. Mr. Joe Aquino stated that there are a lot of changes to the NASCOP and asked why only tow centers provided input. Ms. Mascari stated that she did not know why more responses were not submitted as there were several opportunities to comment.
- H. HSF Comm Working Group (refer to the presentation, *HSF Splinter Group Meeting*). Mr. Mike Allen stated that the purpose of the meeting was to discuss issues and concerns of the HSF community, status of current NISN Service Requests (NSR), and review closed activities since the last NSG. Mr. Allen reviewed the HSF splinter agenda. Highlights from the meeting include discussions regarding the possible move of Space Shuttle support from CERES to Kirtland; implementation of the new circuit between Cheyenne Mountain and GSFC to replace the existing interface; and the White Sands Space Harbor (WSSH). Mr. Aquino stated that a move to Kirtland is highly unlikely. The WSSH T-1 move to DS-3 was discussed and an agreement reached to proceed with moving support of the current T-1 to an Army-provided DS-3. Six action items were assigned.
- I. KSC Forward/Return Link (KFRL) (refer to the presentation, *KFRL Debrief*). Ms. Monique McLamb provided the KFRL debrief for Mr. Chaz Wendling. The project is underway and will replicate the MILA function to build the command link. The transition plan includes validation, verification, and integration testing. If there is an Emergency Mission Control Center (EMCC) test, KSC would like to participate. All pertinent documentation will be reviewed. NTR will present any problems for the project. The current scheduled date is August 2007. Mr. Bangerter asked that Ms. McLamb prioritize the documents to be reviewed and provide comments to the NASCOP. Mr. Marriott asked how the KFRL will be used for Space Shuttle launch and landing.

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Ms. McLamb replied that it will be used during the first day of the TCDT and should the EMCC be activated. Mr. Marsh commented that there are no plans for an EMCC test, nor would there be an opportunity for one should Space Shuttle resume frequent flights.

- J. Ground Network (GN) Verification Test Manual Review (refer to the presentation, *Proposed Updates to the Network Verification Manual for the Space Shuttle Program 450-VTR-STDN [formerly 532-VTR-STDN]*). Mr. Melvin Calhoun stated that the splinter group reviewed proposed changes to the document. The document, as written, assumes that all the stations have the same equipment and that is no longer true. The document currently requires testing of every data/command rate/mode. It has been proposed that that a subset of tests be performed for each mission and complete testing be performed yearly or for major system changes. Additional test scripts are needed for AGO, Wallops 11-meter antenna, and the WSSH Ultra High Frequency (UHF). The AFSCN annex needs to be updated as well. Initial GSFC VTR testing is scheduled for Launch minus 6 weeks. Limited testing will be performed when missions are less than 6 weeks apart. GSFC will update the document and provide a review copy to the elements. The GN updates will be compiled first and the SN updates after the GN update is complete. The updated tests will provide a better indication of networks and system performance. The enhanced performance checks will provide insight into potential support anomalies. Specific pass/fail criteria will be included in the document. Discussion as to how often to perform the different level of the testing will continue.
- K. Wallops 11-Meter Transition (refer to the presentation, *Wallops 11M Transition*). Mr. Mark Harris stated that the splinter was held to discuss the implementation plan, schedule, test plan, requirements changes, and long-range plans related to the Wallops 11-meter antenna transition. The 9-meter antenna is being decommissioned and the 11-meter antenna will be providing Space Shuttle support. Discussion highlights included staffing reductions, requirements changes (recording; loss of Radio Frequency [RF] Command Verification, Command Status; and Site Status Messages [SSM]), ongoing engineering changes, training and documentation schedules, and the future test schedule. Two action items were assigned.
- L. STS-116/-117 Mission Planning (refer to the presentation, *STS-116/117 Mission Planning Splinter Meeting Summary*). Mr. Bill Gainey stated that the current work-to launch dates are December 14, 2006 for STS-116 and February 22, 2007 for STS-117. (Editor's Note: the launch date for STS-116 was subsequently rescheduled for December 7, 2006.) The splinter meeting reviewed the type/level of support requirements for the missions, which are expected to be the same as STS-121/-115. The SN will have Space Shuttle on TDS, TD-171, and TDZ with ISS on TDS, TDW, and TDZ. GN support will be MILA, Wallops, and Dryden Flight Research Center (DFRC) with additional support from the Remote Tracking Sites (RTS) and AGO. AGO will become a PRD requirement. Mr. Marriott asked if AGO will be a requirement prior to STS-116 and Mr. Aquino replied that AGO will. Mr. Marriott asked if the hour [support] limitations will be the same. Mr. Aquino replied yes and the requirement will be written in that way. Mr. Aquino stated that he will discuss the 3-hour support slide with the Flight Directors (FD), noting that it would be a cost to the program. The standard GN and SN tests will be conducted for STS-116. Limited testing is planned for STS-117 due to the short period between missions (54 days). The Wallops 11-meter antenna is prime for all missions with the 7.3-meter antenna as

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- backup. DFRC ATF-1 will be prime and ATF-3 backup for STS-116. DFRC ATF-1 will be prime and ATF-2 backup for STS-117. Three action items were assigned.
- M. Radio Frequency Interference (RFI) Procedures/Problem Reporting (refer to the presentation, *Shuttle RFI Procedures/Process Splinter Meeting*). Ms. Angela Culley stated that the purpose of the meeting was to present RFI procedures and associated activities to mission support elements to determine improvements to the current procedures. The agenda included STS-121 lessons learned on-orbit radars restrictions, local procedures (ER, KSC, GSFC/White Sands Complex [WSC], MILA, White Sands Test Facility (WSTF)/WSSH, WSMR, DFRC/Edwards, JSC engineering, and Wallops), RFIMM overview, and NOSP changes. Ms. Culley noted that it was very productive to have all the right participants in the same place at the same time. RFI detection, mitigation, and reporting procedures are in place and have been successfully implemented. The group identified opportunities for improvement. It was determined that further evaluation of the launch and landing protection criteria is needed. Four action items were assigned.
- N. ER Tracking and CORE Cutover (refer to the presentation, *ER Tacking and CORE Cutover*). Mr. Mike Gawel stated that the purpose of the meeting was to provide a status of the ER CORE Cutover. Discussion highlights included a definition of CORE and a review of testing to be completed. CORE serves as the backbone communications for ER. The remaining Space Shuttle services need to be transitioned to CORE. Six action items were accepted by Mr. Gawel.
- O. JSC NAV (refer to the presentation, *JSC Navigation NSG Splinter Summary*). Mr. Toni Deboeck stated that data routing, site, and network communication issues were discussed at the meeting. He stated that there was improved communication during STS-115. For future flights, prelaunch tracking will begin at L-30 hours. The DoD representative will provide an update on the costs and timeline to implement fixes to Flight Observation Version-1 (FOV1). JSC NAV will also assess the possibility of a temporary refraction fix until FOV1 fixes are implemented. JSC NAV will communicate issues to DoD TRK via the Data Flow Engineer (DFE). DFE will communicate with the network. The GSFC Shuttle Mission Manager (SMM) is the central POC for issues. Open issues will be tracked via action items. The Ground Controller (GC) is coordinating with network elements to participate in the Year End Roll Over (YERO) testing. Mr. Marsh stated that the testing will not include sites that throughput data. Sites that generate or store data should participate. JSC would like to determine how sites that store data will retrieve that data.
- P. Loop Protocol (refer to the presentation, *Loop Protocol and MILA RCI Handover Pages*). Mr. Bill Foster stated that the purpose of the loop protocol meeting was to have a background discussion on examples of voice calls during STS-121 ascent that were not clear or potentially added confusion to ascent support during the Ponce deLeon (PDL) forward link anomaly. There was a discussion on the proper utilization of voice conferences during real-time support of HSF missions. KSC and JSC reps noted that there was not a real drop in their loop protocol proficiency. The general consensus is that the established procedures such as the NOSP, need to be reviewed more frequently. The Network Operations. Integration Team (NOIT) representative had asked if there are inconsistencies between the NOSP and MILA contingency procedures. MILA did not believe that there are, but agreed to verify that there are no inconsistencies. The *JSC Stone Tablets of Flight Control* was reviewed and well received by the attendees. It would

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be useful to have a broader review by the network representatives to refine the document and deploy it to all network elements. Mr. Carl Cramer reviewed the Remote Control Interface (RCI) workstation handover pages. This is the primary tool to perform S-band forward link and Frequency Modulation (FM) downlink (Space Shuttle Main Engine [SSME]) handovers between MILA and antennas and MILA/PDL. The current displays do not have a status on whether the exciters are up. The displays will be modified to provide status on exciter power. This would have helped during the MILA/PDL In Flight Anomaly (IFA). During STS-121, direction by the GC to conduct an early handover from PDL to MILA resulted in SSME drops. MILA will be performing the SSME handover back to MILA, 30 after the S-band forward link handover. Three actions were assigned.

- Q. CERES/AFSCN Support (refer to the presentation, *Splinter Group Meeting AFSCN*). Mr. Jim Bangerter stated that the purpose of the meeting was to discuss AFSCN support to the SSP. Discussion highlights included Det. 12 STS-116 support, Det. 12/50th Space Wing (S/W) roles disposition, contractor changes, NTR transition, Programmable Telemetry Processor (PTP) moves, and voice support. Det. 12 will support STS-116. There has been no decision as to what will happen after STS-116. Det. 12 holds the engineering and operations contracts that support Space Shuttle. All support through Onizuka Air Force Stations (OAFS) will cease. The deadline is March 2007 and there is discussion on how to transition the PTPs. Det. 12 was to provide a voice switch and that is on hold. Six action items were assigned.

SPECIAL PRESENTATION

Mr. Jim Bangerter stated that he was pleased to have Space Shuttle/ISS pictures for the attendees to sign for presentation in honor of several persons who have worked with the HSF Team and are now retiring or moving on to different positions. Mr. Ken Schaaf/WSSH/WSTF, present at the NSG, is retiring. Mr. Schaaf will be retiring prior to STS-116 after 41 years of space program involvement. Mr. Bangerter thanked Mr. Schaaf for his years of dedicated service. Mr. Furman (Smitty) Smith/WSSH/WSTF, not present, is retiring after 35 years of dedicated service. Mr. Smith retired at the end of August 2006. Mr. Smith was instrumental in the design of range communications trunking systems at the site. Mr. Elwin Greer/MILA, not present, known to many as the voice of MILA, will retire prior to STS-116. Mr. Greer was a committed member of the manned spaceflight program for almost 40 years. Mr. Bangerter, stated that the fourth person he wanted to acknowledge is Mr. Bruce Schneck/GSFC/HSF, who is not retiring, but moving on to a new position. Mr. Schneck was the Manager of the HSF group for many years.

Mr. Bangerter introduced a special guest, Mr. Milt Heflin, Deputy Director of Mission Operations Directorate (MOD), who also served as lead of the Flight Director's Office (FDO) as well as a Flight Director. Mr. Heflin stated that it was good to get out and meet some of his favorite people, communications people. He noted the special camaraderie of those who support voice, telemetry, and TV. He stated that communications people make things work no matter how different [systems] are. The FDs can call the GC and get help no matter what. The FDs receive what is needed every time. Manned spaceflight could not have been as successful as it has been without the attendees in this room and those who came previously. He offered his congratulations on the wonderful things that they do. Mr. Heflin stated that he had come to help honor one of the attendees, Mr. Schneck. The honoree has

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been connected with Human Spaceflight for over 30 years. He provided Mr. Schneck with a flown space patch for STS-121. He noted that the patch contains the Latin phrase for 'Achievement through Excellence'. He stated that that is what we do. He noted that Mr. Schneck worked as part of the team that got us back to flying after Challenger and Columbia.

SPACE SHUTTLE MISSION OVERVIEW

Mr. Bob Marriott provided a Space Shuttle mission overview (refer to the presentation, *Space Shuttle Mission Overview*). Mr. Marriott stated that the information in the briefing is unofficial and provided links to the official websites on which the data can be found. Mr. Marriott reviewed the Launch Schedule on which the launch dates and other information was illustrated (e.g., daylight constraints, photographic choices, and handheld photography). Mr. Marriott reviewed the flights, outlining the current scheduled launch date, number of Space Shuttle crew, ISS crew exchanges, GCs, FDs, ISS physical changes, and mission objectives. STS-116 is currently scheduled for December 14, 2006. (Editor's Note: the launch date for STS-116 was subsequently rescheduled for December 7, 2006.). STS-116 is the first SPACEHAB logistics module. STS-117 is currently scheduled for February 22, 2007 (Editor's Note-this date has subsequently changed as well.) This mission will be very similar to STS-115. STS-118 is currently scheduled for June 11, 2007. He noted that STS-118 is the return to flight for Endeavour which has been undergoing modifications. This flight will be very similar to STS-116. This flight will have an automated truss installation (no crew involvement). STS-120 is currently scheduled for August 6, 2007. United States Node 2 will be delivered. Node 2 will contain adapters for Japanese lab, European lab, centrifuge accommodation, and future multipurpose logistics modules.

SN STATUS

Mr. Roy Warner provided an SN status (refer to the presentation, *TDRS Constellation Status*). TD-3 was launched in 1988 and is aging. One of the Traveling Wave Tube Amplifier (TWTA) is degrading. If it is not swapped by June, it could be of concern. TD-8 was deactivated in May and is awaiting completion of the Space Network Expansion (SNE) project. Mr. Warner reviewed the Tracking and Data Relay Satellite (TDRS) network payload status chart. Mr. Warner reviewed WSC software activities. SNE, a major effort, is ongoing. This project accounts for the majority of WSC software engineering. Software delivery 0601 is projected for November 2006. There are no Space Shuttle or ISS specific fixes. Software delivery 06002 is projected for delivery pre-mission December 2006. This contains a possible fix for the false lock problem. Software delivery 07001 is projected for February/March 2007. This delivery will contain more than 40 fixes. There are no Space Shuttle or ISS specific fixes. Mr. Warner reviewed WSC hardware activities. The Line Outage Recorder (LOR) Replacement (LORR) is scheduled for the end of 2006. The high rate/low rate switch maintenance is ongoing. This addresses a chip obsolescence issue. The Automated Data Processing Equipment (ADPE) upgrade is scheduled for the end of 2008. The Guam Data Interface System (GDIS) Replacement (GDISR) is ongoing. He noted that there will be a White Sands Ground Terminal (WSGT) antenna refurbishment. All three antennas require refurbishment. Each antenna will take approximately 2 months.

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MILA/PDL STATUS

- A. Introduction. Ms. Melissa Blizzard provided a MILA/PDL status (refer to the presentation, *MILA/PDL Status*).
- B. PDL Anomaly Updates
 - 1. PDL Launch Trajectory Acquisition System (LTAS) Anomaly. PDL did not have valid LTAS for launch. PDL acquired with an Internet Predict (INP) and went to autotrack. The problem has been traced back to the Tracking Acquisition Processor (TAP) software. Software engineers are reviewing the code. A workaround is in place.
 - 2. PDL Uplink Failure. During STS-121 ascent, PDL was unable to establish an uplink with the Orbiter. The Power Amplifier (PA) power meter indicated that the PA was outputting 0 Watts. Post launch, it was found that the PDL carrier did come up and then dropped off. There was no indication of failure. No faults were logged in the MILA-Bermuda Re-engineering (MBR) system. A Failure Review board was held July 25, 2006. The final report contained 10 recommendations and 7 Requests For Action (RFA). MILA responded to the board and is awaiting a response.
 - 3. Actions. Nineteen alarms/alerts have been identified that need to be added to the higher-level screens prior to STS-116. A plan has been developed and will require a lot of testing. A software audit of the uplink and handover screens has been completed. A hardware configuration audit of the PDL UHF A/G system was completed. No major system problems were found. A spares audit is underway. Software engineering is evaluating a single button failover of the PDL forward link.
- C. Discrepancy Report (DR) Status. Ms. Blizzard provided an overview of the DR status. The projected closure date for DR 36853 (DQM) is unknown. The other DRs have projected closure dates in 2006 and 2007. DR 40385 (TAP) fix is scheduled to be installed post STS-115. The Teltrac UHF antenna is undergoing an overhaul.
- D. Planned Changes. The UHF Teltrac antenna will be repaired. The RCI will be installed at the MILA TV console. The MILA collimation tower will be replaced. The MILA HVAC controls will be upgraded. The Data Generator Replacement System (DGRS) will be installed at MILA and PDL. Software changes are planned for the TAP, RF Subsystem (RFS) Sub-System Controller (SSC), SSM SSC, and RCI.

DFRC STATUS

Mr. Craig Griffith presented a DFRC status (refer to the presentation, *Test Systems Directorate Dryden Flight Research Center*). Mr. Griffith stated that DFRC began planning 3 years ago to upgrade its antenna systems. ATF-3 acceptance testing is complete. The system is certified and operational for Space Shuttle support. Due to system constraints, the ATF-3 is best effort only for onorbit support. ATF-2 upgrades will be performed after ATF-3 acceptance. Portable Spacecraft Simulator (PSS) testing is scheduled for the November time frame. ATF-1 upgrades will be performed after ATF-2 acceptance. The upgrade schedule is dependant on the Space Shuttle launch schedule. PSS testing is To Be Determined (TBD). The Modular Receiver/Transmitter (MRT) radios have been upgraded. In regards to NTR, DFRC is prepared to cutover circuits at the direction of the Network. DFRC can feed NTR and the legacy system simultaneously.

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EXTERNAL TANK TV STATUS

Mr. Fred Pifer provided an external tank (ET) TV status (refer to the presentation, *GSFC ET TV Status presented to the Network Support Group [NSG]*). ET TV is an operational system. The GN supports launch coverage through Wallops Loss of Signal (LOS). The video is remoted in real time via uplink trucks from MILA, Jonathan Dickinson Missile Tracking Annex (JDMTA), and Wallops. All stations record digital images for post-launch evaluation. Analog video is recorded on a best-effort basis. Automatic Gain Control (AGC) strip chart recording is performed on a best-effort basis. Mr. Pifer stated that the video was very good overall. The AGC levels were good. Mr. Pifer reviewed several changes made after each flight (STS-114/-121/-115). Post STS-121, JSC GC's requested that all ET TV testing be completed by Launch – 30 minutes. Post STS-115, there are no station changes planned. During STS-115, all transfers were accomplished electronically. Mr. Pifer stated that changes have been implemented based on lessons learned. Electronic file transfer has been implemented and verified. He closed by stating that all stations are fully operational for Space Shuttle launch support as scheduled.

SPACE NETWORK ACCESS SYSTEM STATUS

Ms. Angela Culley presented a Space Network Access System (SNAS) status (refer to the presentation, *Space Network Access System [SNAS] Project Status*). SNAS will replace the User Planning System (UPS) as an interface to the Network Control Center Data System (NCCDS). SNAS is a Java-based application client interface that will incorporate UPS functionality. SNAS will provide planning/scheduling with real-time monitor and control; interface with the External Processing Systems (EPS) to support existing operations; and provide timeline and scheduling/planning workspace. Since the Critical Design Review (CDR), the project has responded to RFAs, continues developing test scenarios for engineering and Beta testing, continues collecting inputs for the Implementation Plan, and is preparing a purchase list for operational equipment. Ms. Culley reviewed the planned activities list. Ms. Culley stated that there is a 2-week slip in the schedule, but that the operational date has not slipped.

NISN STATUS

Mr. Scott Douglas provided a NISN status (refer to the presentation, *NSAP Technology Refresh – NTR Project NSG Briefing*). Mr. Douglas reviewed the NTR network topology. He stated that additional capacity has been added to JPL since the last NSG. NTR has been deployed to Madrid. Capacity is being extended to Goldstone as well. QoS testing at the AT&T laboratory has been completed. QoS testing at the GSFC IPNOC was scheduled to begin the week of the NSG. The transition schedule through November has been reviewed with the sites at the NSG and the next phase will be discussed at the MCWG in October. Transitions are scheduled to begin October 9 with GSFC/JSC. As many Space Shuttle services as possible will be transitioned prior to TCDT. Mr. Douglas reviewed the operational services to be transitioned. He noted some examples of transitioned services such as the Earth Observing System (EOS) high-rate service and GSFC/DFRC 10-Mbps service (Space Telemetry and Range Safety [STARS]). Mr. Bangerter asked if any legacy circuits have been turned down on the transitioned services and Mr. Douglas replied that no circuits have been turned down. Mr. Douglas reviewed the point-to-point T-1 services that have been cut over and have no NSAP service. There are 3 levels of customer acceptance for NTR services (ready to transition the service, operational testing, and circuit turndown). Several forms are associated with the levels of acceptance. Mr. Marriott asked how the alternate routing in NTR will be tested and prepared for transition. Mr. Douglas stated that NISN

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will test the alternate routing as an element of its testing prior to turning the service over for operational testing. NISN will test failover scenarios. Mr. Douglas reviewed a detailed transition approach. Mr. Douglas suggested that prior to transition, the legacy circuits are tested to ensure that the service is working. Prime and alternate NASA POCs will be established. Once there is an agreement that the service is accepted, NISN will issue a Communications Service Advisory Message (CSAM) to the supporting sites. At that time, NISN will follow its disconnect process. Mr. Douglas reviewed the NISN/Nascom transition and post-transition support. During transition, there will be a dedicated Mission Comm Mgr on console. There will not be a dedicated Comm Mgr for operational testing. Mr. Bangerter stated that when testing with JSC, he would like an STS Comm Mgr on console. Mr. Norman Reese stated that NISN does participate in major testing and will coordinate with Mr. John Hankinson. There will be dedicated voice loop for the transition personnel. Mr. Douglas reiterated the need for personnel to identify the network (NTR or legacy) when reporting problems to the Comm Mgr. Mr. Reese stated that the same communications interface exists for NTR as today to report problems. There will be different reasons identified for outages. Signatures will change and these will be characterized.

ISS MISSION OVERVIEW

Mr. Bob Marriott provided an ISS mission overview (refer to the presentation, *International Space Station Mission Overview*). Mr. Marriott stated that the information in the briefing is unofficial and provided links to the official websites on which the data can be found. Mr. Marriott presented two simulations of the robotic installations planned for the ISS. He presented the Expedition 13 and 14 crews. Mr. Marriott reviewed the Increment 13 and 14 status and activities. Significant activities include Japanese Experiment Module (JEM) vehicle End-to-end (ETE) checkout and several EVAs. Mr. Marriott reviewed the ISS assembly stage overview. P3/4 installation and activation is complete. P5 installation is scheduled for January 2007. Node 2 installation and activation is scheduled for September 2007. Columbus Module installation and activation is scheduled for October 2007. JEM installation and activation is scheduled for January 2008. Mr. Marriott reviewed illustrations and pictures showing the stages of ISS assembly.

VHF STATUS

Mr. Fred Pifer presented a VHF status (refer to the presentation, *Ground Network VHF Status presented to the Network Support Group [NSG]*). VHF stations are operational for ongoing support. VHF-1 provides contingency support for ISS. VHF-2 support emergency-only voice communications for Soyuz. The uplink frequency is restricted over the United States. Mr. Pifer reviewed the Expedition 13 support since the March 2006 NSG. Mr. Pifer reviewed the station changes. DFRC installed a new VHF-1 quad yagi antenna and rotor; VHF-1 notch filter in the uplink to block the downlink spur present when the transmitter is keyed; VHF-1 MRT pre-emphasis/de-emphasis modifications. GSFC engineering is evaluating upgrades and sots to enhance performance at WSC. Pre-emphasis/de-emphasis modifications and notch filters will be installed at Wallops and WSC. Mr. Pifer stated that there is audio noise and possible RFI affecting the WSC VHF-1 downlink RFI monitoring has been ongoing. WSMR Frequency Surveillance has failed to locate the RFI source. The local environment is being checked and there is possible interference from the power lines. Wallops noise has been minimized by correcting grounding problems. Near Earth Networks Services (NENS) engineering has

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developed a test plan to characterized local noise floors at Wallops and WSC. The VHF Support Request message corruption issue has been resolved. The 450-TNOSP-ISS/VHF Annex has been published. Ms. Rebecca Marsh asked how the plans for the pre-emphasis/de-emphasis modifications for Wallops and WSC will be provided to JSC. Mr. Pifer replied that there is a test plan in review and JSC will get a copy. Ms. Lesley Rahman stated that the document is more a test report and Mr. Bangerter stated that it will be released to the network. Mr. Bangerter stated that the network has verified that the pre-emphasis/de-emphasis modifications work.

ISS FRONT END PROCESSOR REPLACEMENT STATUS

Dr. Norman Kluksdahl provided an ISS Front End Processor (FEP) Replacement (FEPR) project status (refer to the presentation, *Front-end Processing Replacement [FEPR] Project*). The current JSC FEPS are obsolete and becoming unmaintainable. A proposal was made to move the ISS FEPS to WSC and move away from the 4800-bit block, provide a cost reduction in serial data processing equipment at JSC, and provide commonality with the MSFC and Backup Control Center (BCC) efforts. This proposal was accepted in April 2006. A detailed design effort was undertaken. A FEPR Detailed Design Review (DDR) was held in August 2006. All 15 Review Item Dispositions (RID) have been dispositioned. The FEPR Layer 3 network lies on top of the NISN NTR network infrastructure. NISN provides the network and network management. JSC will provide the security policy. The IPNOC will manage the FEPR Wide Area Network (WAN). All legs of the network are mission critical except the KSC leg for ISS Multi Element Integration Test (MEIT) testing. JSC will provide the security policy. Dr. Kluksdahl described the installation and test plan. Primary development was done at JSC. MCC testing with the ISS Integration Laboratory (ISIL) and Space Station Test Facility (SSTF) will not involve WSC or NISN. Testing phases will build up to using the Electronic Systems Test Laboratory (ESTL)/ISIL and ultimately a test or two with ISS. A working group has been established to coordinate test requirements and plans. Site preparation work is scheduled to begin February 2007. Site installations are scheduled to begin April 2007. Operations testing is scheduled to begin September 2007. The system is scheduled to be available for operations January 2008. A schedule working group is being assembled to coordinate schedules.

ISS BCC STATUS

Mr. Jeff Morton provided an ISS BCC status (refer to the presentation, *ISS Backup Control Center [BCC] Overview*). The BCC is designed to support minimum crew, vehicle, and system safety. It is designed to minimize interaction between the crew and the ground. It is not capable of handling complex operations. Even with Flight Control Team (FCT) support, capabilities are limited by the ground facilities. The BCTC is made of four teams. The BCC is located in the Houston Support Room (HSR) in Moscow. The BCC Advisory Team (BAT) is a remotely based team of GEMINI flight controllers and FDs who monitor United States ISS telemetry on laptops via MSFC feed. The Backup Communications Team (BCT) is made up of GC, TELCOM, and Pointing personnel who will support in a best-effort basis. The BCC Deployment Team is made up of FCT members who may travel to Moscow after the damage assessment is complete at JSC. The BCC activation timeline is based on the center's hurricane levels. The BCC web server is an enhancement this year. Capabilities lost during BCC include Ku-band (no video downlink and Orbital Communications Adapter [OCA] uplink), S-band (limited by time-tag generation and uplink ability), and command (without MCC-H powered, command

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is limited to RGS only and MSFC as a contingency). There are several open items being worked. Cross training is underway at JSC to provide staffing. Security scanning procedures for connecting NASA laptops to the Open IONet at GSFC Network Integration Center (NIC) are under review. Mr. Aquino stated that has been an open issue for a while. He asked if connecting would be possible if JSC provided reports of the security scans performed on the JSC laptops. Mr. Douglas replied that if JSC provided reports to GSFC security, JSC can connect. He stated that Mr. Matt Kirichok would want the reports in advance. The copy of the report should be sent PKI. Mr. Marriott stated that the reports should be provided as part of the Level 4 sequence. Mr. Morton stated that the reports are sent quarterly, but will also be sent as part of the Level 4 sequence. Open items also include developing contingency for transitioning between JSC and MSFC S-band forward link to WSC during BCC operations. The assumption is that JSC is unable to drop the forward link to WSC. An action was assigned to NISN to determine the best way to drop the JSC ISS S-band forward link and bring up the MSFC S-band forward link. Mr. Marriott asked if there is due date for completion of this action item. Mr. Bangerter stated that he would like to track this item in the NSG. Mr. Mike Allen accepted an action item to determine the best way to drop the JSC ISS S-band forward link and bring up the MSFC S-band forward link (action item NSG-0906-03).

BCTC STATUS

Mr. Bill Gainey provided a BCTC status (refer to the presentation, *Backup Communication Team Center [BCTC] Status*). The BCTC was activated for an annual exercise May 3 through June 6, 2006. The BCC successfully performed scheduling and real-time monitoring of ISS supports and the exercise allowed the team to refine procedures. A Lessons Learned teleconference was conducted on August 10, 2006. Several action items were assigned. The Local Operating Procedure (LOP) for coordinating private conversations on VHF-1 was finalized and incorporated into the TNOSP VVHF Annex. The next activation is scheduled for early May 2007.

NETWORK AND COMMUNICATIONS ANALYSIS AND INTEGRATION TEAM STATUS

Mr. Michael Fanders presented a Network and Communications Analysis and Integration Team (NACAIT) status (refer to the presentation, *NACAIT Status*). The Japan Aerospace Exploration Agency (JAXA) HTV – HTV TDRSS link rack installation is complete in the MCC-H. Network routers will be upgraded. There is a plan for the MCC-H to be the backup to the Space Station Integration and Promotion Center (SSIPC) (for proximity operations only). JAXA JEM payload ETE testing is progressing smoothly. The European Space Agency (ESA) Columbus launch is scheduled for No Earlier Than (NET) September 2007. Two additional tests SBT tests are proposed for ATV (with TDRSS); this is a new item. A new T-1 between JSC and MSFC is being proposed for the Agenzia Spaziale Italiana (ASI) gateway. The Canadian Space Agency (CSA) is moving equipment within their facility. Pat Mattingly has requested a PRD review to review codes and personnel changes. The Russian Space Agency (RSA) re-architecture activity is complete. The administrative traffic was oversubscribed the last mission. Mr. Aquino stated that when the BCC/BAT was implemented, there were mission requirements (not mission critical services) on the administrative network. There was a problem with the overall coordination. The services had to cross multiple administrative networks and there was no single POC for coordination. Mr. Douglas replied that Mr. McMannis at NASA Headquarters is the NASA Chief Information Officer (CIO); however, there are separate Center CIOs.

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NISN does not have authority over the centers. Mr. Aquino asked if there was no central POC when a requirement crosses institutional networks. Mr. Douglas reiterated that there is no one person. Mr. Aquino stated that it should not be necessary to have to coordinate a single requirement across multiple centers with multiple persons. A central POC is needed. Messrs. Jim Bangerter and Joe Aquino accepted an action item to determine the POC (if any) to coordinate communications requirements that cross multiple center's networks (action item NSG-0906-04).

TRANSPONDER 5 STATUS

Mr. Rodney Grubbs provided a Transponder 5 status (refer to the presentation, *Digitization of AMC6 x5 Services*). Mr. Grubbs stated that the goal is to provide low-delay interactive digital video capability without compromising Space Shuttle support. This requires digitizing all uses of Transponder 5. The first implementation is the Live Interactive Media Outlet (LIMO) channel. Mr. Grubbs reviewed the proposed digital carrier configuration. The ICE and Mission Evaluation Room (MER) channels will not be active only during Space Shuttle tanking. The Heads Up Display (HUD) will still be available on landing. Engineering replays will not be streaming video any longer. Mr. Bob Pages is rewriting that requirement. Mr. Marriott stated that Transponder 5 ran behind and JSC cannot have latency on its feeds. Mr. Grubbs stated that the encoders have the lowest delay possible. The LIMO service will be certified, tested, and validated prior to STS-116. The ICE, MER, DFRC, and WSC equipment will be installed by the end of the Calendar Year (CY). Certification and testing will begin between STS-116 and STS-117. There will be parallel operations during STS-117 or STS-118. STS-116 operations will be the same as the last two missions. Mr. Mike Yettaw asked if there is a NASA Headquarters directive to go to hi-def. Mr. Grubbs answered that he would know more on h-def in the upcoming weeks.

HTV PROJECT STATUS

Ms. Angela Culley provided an HTV project status (refer to the presentation, *GSFC HTV Project Status*). The Category 1 HTV TDRSS Compatibility Final Test Report was distributed in June 2006. Category 2 TDRSS compatibility testing with the HTV Proto-Flight Model (PFM) at GSFC is scheduled for April 2007. Monthly teleconferences are conducted with the JAXA RF team. Changes are being incorporated into the HTV/TDRSS Test Plan. Diplexer manufacturing and testing is complete. The HTV Inter Orbit System (IOS) Transponder manufacturing and testing is ongoing. The Consultative Committee for Space Data Systems (CCSDS) data processor Functional Equivalent Unit (FEU) is in development. The ground segment data flow test is scheduled for November 2007. Participants include JAXA, GSFC, and JSC. The HTV FM simulator will be located at GSFC. The test will verify the ground systems compatibility between HTV Operations Control Center (OCS) and the TDRS link. No TDRSS time is required. The HTV/TDRSS/Ground Segment ETE test is scheduled for December 2007. The final ETE checkout using TDRSS at the launch pad is scheduled NET January 2009.

ATV PROJECT STATUS

Mr. Craig Thompson provided an ATV project status (refer to the presentation, *NASA/ESA ATV Status*). The ATV is part of the ESA contribution to the ISS and is an unmanned vehicle used to supply the ISS with dry cargo, water, air, nitrogen, oxygen, and propellant. The ATV is scheduled for a debut flight NET May 2007. ESA has promised five ATV cargo ships through 2015. It is possible, with the planned retirement of the Space Shuttle, that additional ATV flights could be added. Mr. Thompson reviewed

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the command, telemetry, voice, and video services. MCC-H will also provide the TDRSS link between the ESA gateway and ATV. NASA and ESA have conducted a series of System Validation Tests (SVT). SVTs are designed to validate all elements of the space-to-ground communications path. Mr. Thompson summarized by stating that all relevant Ground Segment interfaces to support ATV operations are in place at MCC-H. MCC-H is ready to support the remaining testing and JSC will continue to work with the International Partners (IP) and user community to integrate any additional requirements.

CREW EXPLORATION VEHICLE/CREW LAUNCH VEHICLE OVERVIEW

Mr. Dennis Webb gave an overview on the Crew Exploration Vehicle (CEV)/Crew Launch Vehicle (CLV) program (refer to the presentation, *Constellation Status: CEV and CLV*). Mr. Webb stated that there are emerging requirements, but no real defined requirements at this time. The vision is well known to everyone: complete the ISS; safely fly the Space Shuttle until 2010; develop and fly the CEV no later than 2014; return to the moon no later than 2020; extend the human presence across the solar system and beyond; implement a sustained and affordable human and robotic program; develop supporting innovative technologies, knowledge, and infrastructures; and promote international and commercial participation in exploration. The timelines are very tight for a program of this magnitude. Mr. Webb reviewed the Exploration Roadmap. NASA has kicked off Commercial Orbital Transportation Services (COTS) effort to see if vendors can provide space services. A total of 21 proposals were received from 20 companies across the full spectrum of the industry. Mr. Webb provided a launch vehicle comparison. The Ares I will carry the CEV. The Ares V is an ET with reusable Solid Rocket Boosters (SRB) and will carry the lunar lander. He noted that the proposed rockets are very tall vehicles and the launch pads were cut down to accommodate the Space Shuttle. KSC is working on an efficient approach to use the Space Shuttle launch pads. The Orion consists of four functional modules (launch abort system, crew module, service module, and spacecraft adapter). The Orion is a very Apollo-like paradigm, but different in that it will use different materials. The vehicle is intended to be used as an ISS rescue vehicle and a lunar lander (6 crew for rescue for short periods and 4 crew for lunar exploration). Communications will be similar to today as we continue to learn what will be unique. Mr. Webb stated that it has been a busy year reviewing the years major milestones. Mr. Webb reviewed the Constellation Project organization chart, noting that the project is a hugely participatory project with all centers involved. The Constellation Program is a Level 2 program with 5 projects. More projects will be added later.

JEM – ICS/TDRSS TESTING

Mr. Tim Early gave a presentation on JEM – ICS TDRSS testing (refer to the presentation, *JEM ICS as a backup to the ISS Ku-band Subsystem Presentation to the NSG*). The Ku-band sting onboard the ISS is single string. The Ku-band antenna spare is manifested to be on the last Space Shuttle flight in 2010. There is no launch vehicle to bring the spare to the ISS when Space Shuttle stops flying. The ISS C&T team has been in discussion with JAXA and GSFC/WSC about the possibility of using the ICS as a backup to the ISS Ku-band. Mr. Early reviewed the capabilities lost when the Ku-band is down, the current ISS S-/Ku-band and JEM ICS configuration, and the JEM ICS capabilities. The ICS uses the Data Relay Test Satellite (DRTS). The current and only DRTS will be at the end of its design life in 2009; although, it's expected lifetime is a few years longer. JAXA has no other ICS hardware than the

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one flight unit. JAXA will use the USOS Ku-band system for JAXA's payload data downlink prior to and post JEM ICS activation. NASA has committed to provide a percentage of Ku-band downlink bandwidth to JAXA. An initial feasibility assessment during 2005 yielded good results. GSFC has committed TDRS J Ka-band to support this capability. Several issues do remain to be worked. There are also several areas of uncertainty. The NASA data system never touched the ICS; everything looks compatible on paper. There is very limited opportunity for fixes if problems are found. A three-phased test plan was developed, but was never executed due to difficulties in obtaining an RF license. Testing is required to establish compatibility. Two options exist. Perform a three-phased ground test prior to ICS launch or perform an onorbit Station Development Test Objective (SDTO) once ICS has been activated. Option 1 is the best option, allowing greater troubleshooting, but has cost and a limited schedule. Option 2 allows high fidelity checkout of the entire system and has a lower cost, but if there are problems, the ability to troubleshoot and resolve the problems onorbit will be extremely limited. The program has selected Option 2. There will be no ground test of the ICS to determine TDRSS compatibility. The onorbit SDTO activity could take place in November 2008.

ACTION ITEM REVIEW

The following action items were assigned at the September 28, 2006, NSG:

- | | |
|------------------------|--|
| NSG-0906-01
ACTION: | Gary Morse/NASA
Determine the CDT Project Lead (this person needs to be a KSC individual). |
| NSG-0906-02
ACTION: | Mike Allen/GSFC/NISN
Determine the involved sites and determine the POCs at the involved sites to participate on the CDT Modification Team. The first POC is Dave Theriault at JSC. |
| NSG-0906-03
ACTION: | Mike Allen/GSFC/NISN
Determine the best way to drop the JSC ISS S-band forward link and bring up the MSFC S-band forward link. |
| NSG-0906-04
ACTION: | Jim Bangerter/GSFC/NASA, Joe Aquino/JSC/NASA
Determine the POC (if any) to coordinate communications requirements that cross multiple center's networks. |

CLOSING REMARKS

Mr. Jim Bangerter thanked the attendees for their participation in the splinter sessions and the main forum of the NSG. He stated that it had been a very busy, very productive week. Mr. Bangerter stated that the next NSG is tentatively scheduled for the week of March 26, 2007. The main forum of the NSG will be held March 29, 2007. This date is now TBD depending on the launch date for STS-117 (most likely a mid-April meeting).

NSG Acronyms and Abbreviations

ADPE	Automated Data Processing Equipment
A/G	Air-to-Ground
AGC	Automatic Gain Control
AGO	Santiago
AFSCN	Air Force Satellite Control Network
ASI	Agenzia Spaziale Italiana
ATF	Aeronautical Tracking Facility
ATV	Automated Transfer Vehicle
BAT	BCC Advisory Team
BCC	Backup Control Center
BCT	Backup Communications Team
BCTC	Backup Control Team Center
CCB	Configuration Control Board
CCSDS	Consultative Committee for Space Data Systems
CD&SC	Communications Distribution and Switching Center
CDR	Critical Design Review
CDT	Count Down Timing
CERES	Center for Research Support
CEV	Crew Exploration Vehicle
CIO	Chief Information Officer
CLV	Crew Launch Vehicle
COTS	Commercial Orbital Transportation Services
CSA	Canadian Spaced Agency
CSAM	Communications Service Advisory Message
CY	Calendar Year
DCN	Documentation Change Notice
DDR	Detailed Design Review
DFE	Data Flow Engineer
DFRC	Dryden Flight Research Center
DGRS	Data Generator Replacement System
DR	Discrepancy Report
DRTS	Data Relay Test Satellite
EMCC	Emergency Mission Control Center
EOS	Earth Observing System
EPS	External Processing Systems
ER	Eastern Range
ESA	European Space Agency
ESTL	Electronic Systems Test Laboratory
ET	External Tank
ETE	end-to-end
FCT	Flight Control Team
FD	Flight Director
FDO	Flight Director's Office

NSG Acronyms and Abbreviations

FEP	Front End Processor
FEPR	FEP Replacement
FEU	Functional Equivalent Unit
FM	Frequency Modulation
FOV1	Flight Observation Version -1
FY	Fiscal Year
GC	Ground Controller
GDIS	Guam Data Interface System
GDISR	Guam Data Interface System Replacement
GN	Ground Network
GSFC	Goddard Space Flight Center
HSF	Human Spaceflight
HSR	Houston Support Room
HTV	H-II Transfer Vehicle
HUD	Heads Up Display
ICD	Interface Control Document
IFA	In Flight Anomaly
INP	Internet Predict
IOS	Inter Orbit System
IONet	Internet Protocol Operations Network
IP	International Partners
IPNOC	Internet Protocol Network Operations Center
IRIG	Inter-Range Instrumentation Group
ISIL	ISS Integration Laboratory
ISS	International Space Station
JAXA	Japan Aerospace Exploration Agency
JDMTA	Jonathan Dickinson Missile Tracking Annex
JEM	Japanese Experiment Module
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
KFRL	KSC Forward/Return Link
KSC	Kennedy Space Center
LCC	Launch Control Center
LIMO	Live Interactive Media Outlet
LOP	Local Operating Procedure
LOR	Line Outage Recorder
LORR	Line Outage Recorder Replacement
LOS	Loss of Signal
LTAS	Launch Trajectory Acquisition System
MBR	MILA-Bermuda Re-engineering
MCC	Mission Control Center
MCWG	Mission Communications Working Group
MEIT	Multi Element Integration Test

NSG Acronyms and Abbreviations

MER	Mission Evaluation Room
MIDDS	Meteorological Interactive Data Distribution System
MILA	Merritt Island Launch Annex
MOD	Mission Operations Directorate
MRT	Modular Receiver/Transmitter
MSFC	Marshall Space Flight Center
NACAIT	Network and Communications Analysis and Integration Team
NASA	National Aeronautics and Space Administration
NET	No Earlier Than
NIC	Network Integration Center
NENS	Near Earth Networks Services
NCCDS	Network Control Center Data System
NISN	NASA Integrated Services Network
NME	Non-Maintainable Equipment
NOIT	Network Operations. Integration Team
NOSP	Network Operations Support Plan
NSAP	Network Services Assurance Plan
NSG	Network Support Group
NSR	NISN Service Request
NTR	NSAP Technology Refresh
OAFS	Onizuka Air Force Station
OCA	Orbital Communications Adapter
OCS	Operations Control Center
PA	Power Amplifier
PDL	Ponce de Leon
PFM	Proto-Flight Model
POC	Point-of-Contact
PSS	Portable Spacecraft Simulator
PTP	Programmable Telemetry Processor
PRD	Program Requirements Document
QoS	Quality of Service
RAIL	Rolling Action Item List
RCI	Remote Control Interface
RFA	Request for Action
RFI	Radio Frequency Interference
RFIMM	Radio Frequency Management Interference Manual
RF	Radio Frequency
RFS	RF Subsystem
RID	Review Item Disposition
RTS	Remote Tracking Site
SDTO	Station Development Test Objective
SMM	Shuttle Mission Manager

NSG Acronyms and Abbreviations

SN	Space Network
SNAS	Space Network Access System
SNE	Space Network Expansion
SRB	Solid Rocket Booster
SSC	Sub-System Controller
SSIPC	Space Station Integration and Promotion Center
SSM	Site Status Message
SSME	Space Shuttle Main Engine
SSP	Space Shuttle Program
SSTF	Space Station Test Facility
STARS	Space Telemetry and Range Safety
SVT	System Validation Test
S/W	Space Wing
TAP	Tracking Acquisition Processor
TBD	To Be Determined
TCDT	Terminal Countdown Demonstration Test
TDRS	Tracking and Data Relay Satellite
TDRSS	Tracking and Data Relay Satellite System
TWTA	Traveling Wave Tube Amplifier
UHF	Ultra High Frequency
UPS	User Planning System
VHF	Very High Frequency
WAN	Wide Area Network
WSC	White Sands Complex
WSGT	White Sands Ground Terminal
WSMR	White Sands Missile Range
WSSH	White Sands Space Harbor
WSTF	White Sands test Facility
YERO	Year End Roll Over