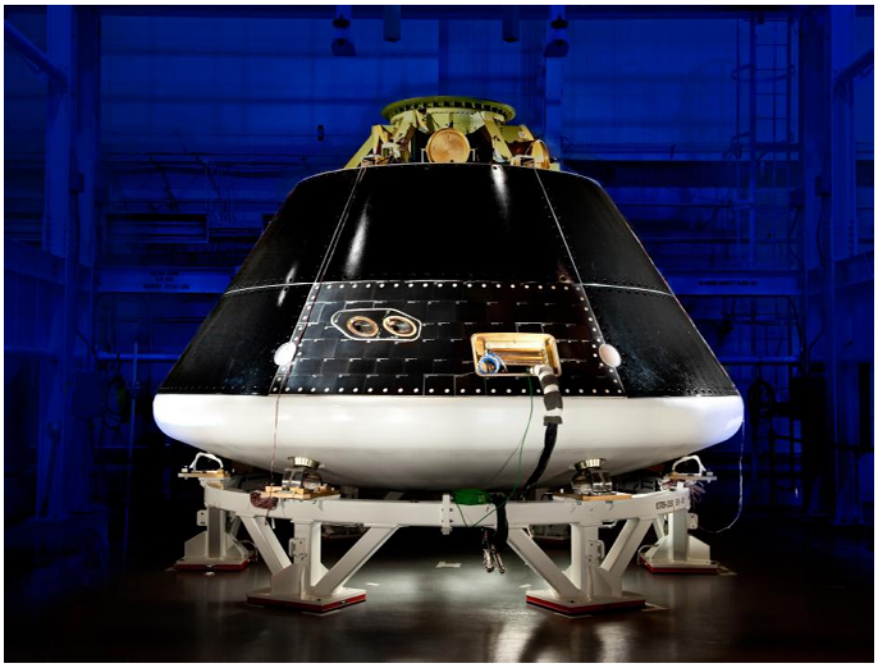
Human Spaceflight (HSF)
Network Support Group (NSG)
Meeting

October 20, 2011



This image is of the Multi Purpose Crew Vehicle (MPCV) at the Lockheed Martin Vertical Test Facility in Colorado.

Human Spaceflight (HSF)
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October 20, 2011

Johnson Space Center (JSC), TX
Gilruth Center

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

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The attendees listed below attended all or part of the October 17 – October 20, 2011 NSG (splinter sessions and/or main forum).

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Network Support Group Minutes

INTRODUCTION

Mr. Jim Bangerter convened the October 20, 2011, Human Spaceflight (HSF) Network Support Group (NSG) meeting to discuss requirements, planning, and issues in support of the International Space Station (ISS) and Visiting Vehicles (VV). Mr. Bangerter welcomed the attendees and thanked them for their attendance at the NSG.

Mr. Bangerter noted that there is a lot of work ISS, VV, and commercial work going on. The Integrated Network (IN) has supported one SpaceX flight and a second is scheduled for the January time frame. If successful, SpaceX will begin resupply missions to the ISS. Orbital will also begin test flights soon. During the next year there will be five commercial missions to support which will replace the Space Shuttle missions.

Mr. Bangerter thanked Mr. Earl Baum for his support in coordinating logistics for the meeting.

October 2011 NSG splinter session and main forum presentations and minutes can be accessed at the following URL: http://scp.gsfc.nasa.gov/hsfnsg/nsg/0510/nsg.htm

HSF RAIL REVIEW

Mr. Steven Testoff provided a review of the HSF Rolling Action Item List (RAIL) (refer to the presentation, *Human Spaceflight [HSF] Action Item Status*). Mr. Testoff thanked the assignees for their cooperation leading up to the NSG. Many long-standing action items were closed. Mr. Testoff reported that there were 7 meetings with open Action Items (AI) for a total of 9 open items, 1 over due item, and 1 meeting with overdue items. Mr. Testoff reviewed the open action items:

A. Action Item 120209-OSC-COMPAT-02. It was reported during the splinter meetings that Wallops had received data from Orbital, but it was not raw data. Wallops is waiting on another set of data.
B. Action Item 0510-NSG-KFRL-01. Mr. John Steffes provided a presentation during the main forum of the NSG. This item is **CLOSED**.
C. Action Item 0910-NSG-ECC-02. Mr. Dan Jackson has not completed the eccentricity report. This action is now due at the end of December 2011. Mr. Bangerter will discuss this topic with Mr. Mike Bielucki at the White Sands Complex (WSC).
D. Action item 081111-VV-Cband-01. This item was discussed as part of the Space Shuttle Program requirements Document (PRD) discussions. Mr. Joe Aquino is looking for a place to document remaining requirements. Mr. Gary Morse stated that he would like to understand all cost items for the Eastern Range (ER). Mr. Bangerter stated that there are requirements for certain services that other ER customers will need, but do not fit into the ISS program and ISS does not need. Mr. Aquino stated that these are more like agency requirements. All costs/services are contained in a spreadsheet that has been provided. Ms. Angela Culley stated that the services will not be turned down. The services are currently in the Space Communications and Navigation (SCaN) Project Service Level Agreement (PSLA). Mr. Bob Marriott asked if a SCaN or Goddard Space Flight Center (GSFC) Networks Integration Management Office (NIMO) PRD is needed for

infrastructure requirements. Mr. Morse stated that this should be looked at. Eventually all three networks will be one integrated network. There is a lot of work to be done with Communication Service Office (CSO) and the Flight Dynamics Facility (FDF).

E. Action Item 082411-ODAR-WG-02. Input for the transition plan was collected at the Obsolescence-Driven Avionics Redesign (ODAR) Working Group (WG) splinter. This item is **CLOSED**.
F. Action Item 082411-ODAR-WG-03. Dr. Kluksdahl is working with Mr. Tracy Minish to determine how this risk will be formally documented. This risk has been raised through JSC MOD. This item is **CLOSED**.
G. Action Item 082411-ODAR-WG-04. Dr. Kluksdahl is working with Mr. Tracy Minish to determine how this risk will be formally documented. This risk has been raised through JSC MOD. This item is **CLOSED**.
H. Action Item 0911-SpaceX Dry Run-03. This item was discussed during the splinter groups. (Editor's Note - The data rates were confirmed after the NSG. The SpaceX PRD data rates were changed from 2kbps to 8kbps and Ms. Kitty Holman sent out the notice on 10-27-11.) This item is **CLOSED**.
I. Action Item Joint Operations WG 2709. Mr. Morse asked if this capability will be a part of the Space Network (SN) Ground Segment Sustainment (SGSS). Mr. Bangerter stated that he does not know, but the SN is providing SGSS briefings. This item remains **OPEN**.

HSF DOCUMENTATION STATUS

Ms. Jennifer May (for Mr. Earl Daniel) provided an HSF documentation status (refer to the presentation, *Human Space Flight Documentation Status/Plan*).

A. Ms. May reviewed the documents updated/published since the March NSG. Five documents were published and she noted that 3 have been rendered obsolete since the conclusion of the Space Shuttle Program (SSP).
B. Ms. May reported that the Freeze Exemption Form (FER) has been given a form number and is in Configuration Control Board (CCB) review.
C. Ms. May reported that two documents are in General review.
D. Ms. May reported that four documents are in Local/Team review.
E. Ms. May reported that three documents are on hold. She reported that four documents require updates to remove SSP data. Approximately 12 documents still need to be reviewed for SSP data.
F. Ms. May reviewed the document updates scheduled for the next Fiscal Year (FY). Eight documents are scheduled for update.

NSG SPLINTER SESSION SUMMARIES

Each splinter Chairperson or designee was asked to provide a brief summary of the splinter session activities.

A. Mission Operations Voice Enhancement (MOVE). Mr. Dan Duffy provided a MOVE splinter summary (refer to the presentation, *MOVE Type-D Keyset Incident*). The keysets represent a fire hazard. Five incidents have been reported since June 10, 2011. The

cause is associated with the high voltage side of the backlit inverter board arcing to the ground. There is an issue with the speaker wire insulation, backlit inverter board fastener, and materials collecting (dust, dirt, debris). Several solutions have been identified. FUSA will retrofit all NASA Type-D keysets. The retrofit will be done at the sites in up to two phases. The retrofit is scheduled to begin in November 2011. The NASA sites will need to provide escorts, an Electrostatic Discharge (ESD) area, and keyset interface to the switch for testing. There are some concerns. FUSA is having issues acquiring the needed materials from suppliers in timely manner. They are actively working with their suppliers. After discussions with operations personnel, the 10-minute time frame is not practical. Mr. Duffy will work with investigation team and safety organizations to see if there is a solution other than the 10 minutes. A recent issue is the concern over the toxicity of fumes. This is under investigation. There were no action items.

B. ODAR Status (no presentation was provided). Ms. Aldora Louw provided an ODAR splinter summary. She reported that the ODAR WG met to discuss the transition plan and collect inputs for the document. The current plan is for there to be two Integrated Communications Units (ICU) on board prior to transition, although there remains the possibility of there being one. The fallback posture needs to be maintained for 18 months. Even with two ICUs, there will remain the need for a fallback posture. Ms. Louw will distribute the transition document for review. There were no action items

C. GSFC FDF Dropbox Changes (no presentation was provided). Ms. Aldora Louw reported that the Johnson Space Center (JSC) had learned that changes were planned for the FDF external interfaces. The meeting was held to review those changes and determine what was required at JSC. FDF is replacing the Zappa server with another box. There will need to be firewall changes with the Front End Processor Replacement (FEPR) network. This will need to be done and then an assessment as to whether any Mission Control Center (MCC) changes are required. There were no action items.

D. Very High Frequency (VHF) Status (refer to the presentation, *ISS/SOYUZ VHF Support Team, VHF Ground Station Status Summary*). Mr. Kevin Riley provided a WSC operational issues and VHF status splinters summary. The purpose of the splinter session was to provide an update of the VHF ground stations status. The VHF Emergency Communications Verification support requirement is changing from monthly to quarterly. A method is being discussed to maintain proficiency. Multiple upgrades are in process at WSC. The major upgrade is the separation of the VHF-1 and -2 antennas. This separation will improve gain. Additionally, the recording capability on VHF-1/2 audio will be implemented via MOVE. The Tracking and Data Relay Satellite System (TDRSS) Network Operations Support Plan (NOSP) (TNOSP) is undergoing a major rewrite. The VHF Summaries have a from number and are available on NGIN. Four action items were assigned; however, two will be combined.

E. Soyuz-28S/29S Mission Planning (refer to the presentation, *Soyuz-28/Expedition-29/30 Soyuz-29/Expedition-30/31 Planning*). Mr. Riley stated that the purpose of the meeting was to present upcoming GSFC Soyuz support information. Mr. Kevin Riley reported that the meeting reviewed the C-band support. Coverage used to be provided for orbits 4,

5, and 6; but coverage has gone away for orbits 4 and 5. Support will be provided for orbit 6 only. C-band support will be provided for contingency/emergency support and will not be scheduled up. If needed, a contact list is available and support will be requested. Mr. Mike Gawel stated that it was agreed that the ER would provide a radar status to the Spaceflight Mission Managers (SMM). Mr. Riley reviewed the launch dates for 28S and 29S. Mr. Marriott stated that Soyuz-29S can be ready to fly by December 21, but the Program has not approved that date yet.

F. C-band Contingency Procedure Discussion (no presentation was provided). Mr. Jim Bangerter reported that since stopping C-band support, the main method of identifying support is the Interim Support Instruction (ISI). The attendees reviewed the ISI, updated information, and reached concurrence. The procedure will be included in the TNOSP in a future revision. Changes to the TNOSP procedure will be done via ISI. The plan is that, eventually, all VV support will be contingency/emergency once their missions have been validated. Mr. Gary Morse asked the VV projects have GPS and Mr. Bangerter replied that we know they do. Mr. Aquino stated that we have yet to get information on the CC Development. Mr. Bangerter stated that he will pursue that. Mr. Aquino stated that he assumes that the CC Development project will require 5 passes as did the other VVs.

G. Integrated Requirements Post Space Shuttle (no presentation was provided). Mr. Aquino stated that all services in the SSP PSLA have been dispositioned. There is on ongoing effort to identify the services required for future programs. As these services are identified, they are being moved to other PSLAs. NASA Integrated Services Network (NISN) Service Requests (NSR) will be used to turn services down. Mr. Marriott stated that the voice services need to be reviewed again. JSC has marked some services as having future use, but had no names and NISN has marked the services as not needed. For JSC, a name change only requires a change to the MOVE database. If the services become unassigned, they will be harder to reactivate. Mr. Aquino stated that NISN does want to reclaim bandwidth. NISN has also agreed to leave hardware in place. JSC has identified the need to keep Meteorological Interactive Data Display System (MIDDS) until the new Cape service is ready. DOLILU will not be needed until there is the new Space Launch System (SLS). All the remote weather services do not have owners and some are being moved to the Kennedy Space Center (KSC) PSLA. The NASA portion of National Oceanic and Atmospheric Administration (NOAA) will be turned down; there is an agreement with NOAA for its portion. The Launch and Landing and Flight PRDs have been reviewed. JSC has identified services to be retained, even those without owners. One of the services identified is the TTY. These need to be retained and documented, but no owners have stepped up yet. These really are Agency-type services. SCaN is paying for these services. Perhaps a SCaN PRD is needed. There are fewer than 100 of these Agency-type requirements that need to be retained and documented. Mr. Morse asked how many PRDs there will be. Mr. Aquino stated that there will be a MPCV PRD and separate documents for each flight. ER requirements need a document. Other users of C-band need a place to be documented as well. GSFC is the R&R

Manager for HQ and it could be discussed that GSFC could be a document manager. Mr. Morse stated that if SCaN is the appropriate owner, it should be discussed.

H. ISS VV TDRS Scheduling WG (no presentation was provided). Mr. Bob Hudgins reported that the scheduling strategy for ISS and VV is similar to that for the Space Shuttle. East/ West/ 275 for ISS and Spare/ 171/ 275 for VV. Single Access (SA) 2 will be available. The schedule process is a 4-week process and the key is the period at 3 weeks out. WSC wants all SARs in. The priority list is not used in real time or the active week. A planning telecon will be held at L-30 days. Critical periods need to be identified as soon as possible. Critical period ISIs will be published. When there is a freeze, WSC will not freeze an entire Space-to-Ground Link terminal (SGLT). Common equipment and mission-related equipment will be frozen. Mr. Hudgins stated that there will be a lot of TDRS constellation moves in 2012. As soon as WSC knows what is changing, the network will be informed. F10 is being drifted and will become TDRS West (TDW) ultimately. F4 will be super synced for its end of mission.

I. WSC Database Change Protocols (no presentation was provided). Mr. Erik Richards reported that a NCC Data System (NCCDS) and Space Network Access System (SNAS) discussion was held. A new, more streamlined data flow has been agreed to. The SMMs have been included in the data flow. No action items were assigned.

J. Automated Transfer Vehicle (ATV)-3 Update and Mission Planning Status (refer to the presentation, *ATV-3 Mission Status Splinter Summary).* Mr. Thomas Russell provided an ATV-3 mission status meeting summary. The new launch date is scheduled for 02/29/2012 and docking is scheduled for 03/19/2012. The mission profile and TDRSS communications were discussed. The 64kbps High Data Rate (HDR) telemetry SMA services were successful during ATV-2 mission and will be used during the ATV-3 mission. A scheduling teleconference with JSC, SMMs, and WSC Forecast Scheduling will be held 30 days prior to the mission. C-band support will be scheduled for contingency only. An ISI will be distributed. The FDF requirements for orbit determination after undocking were discussed and will be documented. Network testing will be defined. No action items were assigned.

K. H-II Transfer Vehicle (HTV)-3 Update and Mission Planning Status (refer to the presentation, *HTV-3 Update and Mission Planning Summary).* Mr. Melvin Calhoun provided an HTV-3 mission status meeting summary. The launch date is expected to be moved to late May/early June 2012. A Second Generation (MELCO) Transponder (Avionics Module) will be prime for the mission. One action item was assigned. (Editor's note: the action was assigned to Mr. Calhoun and has been closed.)

L. TDRSS VV Vector Support (refer to the presentation, *Visiting Vehicle Vector Support Splinter Group Summary*). Mr. Melvin Calhoun provided a summary for Mr. Aaron Frith. The purpose of the meeting was to discuss a plan to address the HTV-3 lock anomaly that occurs during the post undock phase of the mission. Trajectory Operations Officers (TOPO) will update the vectors more often for VVs to prevent late acquisition problems from occurring in the future. An updated vector will be sent out at a designated time between post departure and re-entry (18 to 24 hours). The GSFC SMMs will generate an ISI. No action items were assigned.

M. HSFC WG. Mr. Michael Thomas provided an HSFC WG splinter summary (refer to the splinter group presentation, *Human Spaceflight HSF*). Mr. Thomas reported that the Mission Wide Area Network (WAN) NSRs are on track. He noted that NSR 36707 is local JSC work and the PSLA needs updating. Mr. Thomas reported that ISS video work continues and some NSRs are on hold. In regards to NSR 36578, the DCS Package and MCSR both are "Approved" and the customer is working 'funds' transfer. The MCSR is being pushed for fiber install and OOBA lines to be installed by 10/28. Start of service is anticipated for 10/31. Mr. Thomas reviewed the MPCV/ORION NSRs. NSR 36520 has been cancelled. Video for Exploration Flight Test (EFT)-1 is now a requirement on the Remote Tracking Sites (RTS). It is not known how this will be implemented. NSR 36462; circuit installation is in progress. The EDL-H termination has been made and AT&T is currently working on delivery to the Mission Control Center (MCC). Internal cabling within the MCC is being scheduled. AT&T will be at JSC on 10/20. NSR 36722 is in draft (gathering and verifying requirements). A DSM will be submitted. NSR 36723 is in Draft (gathering and verifying requirements). A DSM will be submitted. The Program has the correct number – 24 keysets. Need to finalize the number of T-1s. Mr. Joe Aquino is working on an email and will cc Mr. Eric Barcon. For the Shuttle Mission disconnects, NSR 36740 has been submitted to disconnect DHEM-791892 circuit from KSC to Merritt Island Launch Annex (MILA) – Ponce deLeon (PDL) and return all NASA/CSO provided equipment. Mr. Morse stated that there needs to be some thought given to PDL. PDL is not closed, but is in caretaker mode. No one is using the site now, but eventually there will need to be discussions on diversity and redundancy. Mr. Aquino stated that he is not aware of any plans to use PDL for MPCV, but it may be used for SLS in 2015. Mr. Marriott asked about the Kennedy Tracking Station (KTS). Mr. Morse stated that KTS is a SCaN effort. This is part of discussions with the ER (what is needed and what data rates). KTS needs to be properly sized. KSC has been told that there is also the 21 Century Range effort and that KSC does not need to solve the capacity issue on its own; there is a SCaN effort and flow and process.

CSO MISSION OPERATIONS STATUS

Ms. Heather Kobin (for Mr .Scott Douglas) provided a CSO mission operations status (refer to the presentation, *Communication Service Office [CSO]*). Ms. Kobin reviewed the Information Technology & Communications Directorate (ITCD)/Code 700 organization chart. Mr. Brad Torain is Deputy Director for Operations. Mr. Keith Keller is the Chief for the Communications & Security Services Division/Code 760; Ms. Rita Kemp is Associate Chief. The Mission Services Managers are in this group. Ms. Kobin reviewed the Mission Communications Organization. This organization includes the Operations Lead, Security Lead, System Engineering Leads, Voice Lead, and MOVE Project Manager. Mr. Morse asked who would handle new requirements. Ms. Kobin replied that the Customer Service Representative (CSR) does. The same requirements process is in place as before. Ms. Kobin reviewed the NASA Integrated Communications Services contract (NICS) Mission Communications Organization. The GSFC mission Services Manager is Mr. Bill Epstein. CSRs are Ms. Angela Culley and Mr. Mike Eder. Mr. Jeff Bankert is engineering lead. Mr. Paul Hill is operations lead, and

Mr. Mike Quint is Operations Support lead. Ms. Kobin reviewed the Mission Network Outages Notification changes. The notification process is changing. The Mission Service Outage Notification (MSON) will replace the Mission Outage Notification (MONS). MSONs will be distributed for service outages. If a service is alt routed without impact, there will be no notification. Outages will be announced over the loops. The Daily Summary Report (DSR) will still be distributed. Ms. Kobin stated that as a result of the new contract, Carrier Service Level Agreements (SLA) are measurable. There are now two types of sites (A = Mission Critical and B = Mission Support). Mr. Morse asked how many SLAs exist and Mr. Bankert responded that there are over 1,000. A list can be provided. The list is maintained in an internal application. Ms. Kobin stated that the CSO does have PSLAs and they are also tracked. Mr. Morse stated that he is responsible for the SCaN agreements and needs to work which are applicable and which are not. He stated that he would like to see the PSLAs if possible. Ms. Angela Culley accepted an action item to provide copies of the CSO PSLAs to Mr. Morse (action item 102011-NSG-01). (Editor's: Note: this action item is **Closed**.) GSFC is participating in the Emergency Notification and Accountability System (ENS). Mission Operations will issue a notification by phone, email, and text if there is a major event that could impact Mission Operations personnel or the network. Ms. Kobin reviewed the NASA Communications Mission Critical Network Major Sites (backbone) diagram. Mr. Marriott stated that during a meeting last week, there was discussion of change. He asked what will change at JSC and how the change will be coordinated. Mr. Bankert stated that the change will be the assumption of the JSC Campus Local Area Network (LAN) into the Corporate Network. The Mission Network is not being impacted.

MILA CLOSURE VIDEO

A MILA closure video was shown to the attendees. The video included a history of MILA and the missions it has supported and included interviews of personnel who have worked at MILA.

SN STATUS

Mr. David Glasscock presented an SN status (refer to the presentations, *SN Status*).

A. Mr. Glasscock provided a TDRS fleet status. He stated that TD3 is now TDRS-Spare; TD4 is in storage and will be super synced. TDRS-9 is now TDRS-East and TDRS-10 is drifting to 174 degrees West. Mr. Glascock reviewed the TDRS constellation configuration diagram. JSC had received concurrence to relax the TDRS eccentricity requirements, but that action was suspended. JSC needs to deliver software to ISS. TDRS-3 Traveling Wave Tube Amplifier (TWTA) #2 helix current continues to rise with an expected failure sometime this summer.
B. Mr. Glasscock reviewed the WSC hardware activities. Antenna SSC work continues. Second TDRSS Ground Terminal (STGT) and the Guam remote Ground Terminal (GRGT) installations are complete. Firmware testing and installation is ongoing at the White Sands Ground Terminal (WSGT) SGLTs. The 25-Mbps forward link installation and testing is complete. WSC is waiting to begin Technical Operation and Analysis (TO&A) testing with the JSC Electronic Systems Test Laboratory (ESTL). All MOVE installations are complete (STGT, WSGT, and GRGT). All legacy voice systems have been removed (STGT, WSGT, and GRGT). The final MOVE Operational Readiness

Review (ORR) was held on September 26 and 6 Requests for Action (RFA) are being worked. A draft PRD has been distributed for the removal of Space Shuttle unique hardware and software.

C. Mr. Glasscock provided a WSC software status.
D. Mr. Glasscock provided a TDRS-K/L project status. WSC is in the process of modifying equipment for the next generation of TDRS satellites. The Space Communications Network Services (SCNS) contract has completed the TDRS K TDRS Operations Control Center (TOCC) facility for use in mission rehearsals and onorbit testing. The TDRS K TOCC is located at WSGT. The final software merge will take place with SW Delivery 10007.
E. Mr. Glasscock provided a WSC VHF status. WSC is in the process of procuring and installing a new VHF-1 antenna. The existing VHF-1 ground hardware will be relocated to the site of the new antenna. The new tower is on order. The Engineering Change (EC) approval is expected on November 9. Completion is scheduled for December.

WALLOPS GROUND STATION STATUS

Mr. Mark Harris presented a Wallops Ground Station (WGS) status (refer to the presentation, *Wallops 11M/VHF Status*). Since the last NSG, WGS is installing new S- and X-band equipment and associate hardware and software. The 11M antenna will provide S-band uplink and downlink service to the Cygnus one orbit after separation. Data transfer through the Standard Autonomous File Server (SAFS); accounts have been created. Mr. Harris provided a VHF-1/2 status. There have been no S/W or H/W upgrades and are no current issues. WGS supported four VHF-1 ISS tracks with no problems noted; eight VHF-2 Soyuz 26 tracks in April 2011 with no problems noted; and eight VHF-2 Soyuz-27 tracks in June 2011. During the Soyuz support in June, WGS encountered problems on the first track (orbit 6) due to anomalous Two Line Element (TLE) data received at all three sites (Wallops, WSC, and Dryden). Wallops operators verified the nominal Improved Inter-range Vector (IIRV) acquisition data and determined it showed good track times as compared to the VHF-2 "Fodtrack" times. The Acquisition of Signal (AOS) times were approximately 40 minutes off between the anomalous TLE and the IIRV. Operators used Monitor and Control (M&C) to convert the good IIRV to a TLE the VHF-2 system could use, copied the file to the VHF-2 computers, and verified matching times. The TLE was sent to WSC and both sites were able to successfully track the Soyuz-27S on the next view. Dryden could not use the WGS TLE due to system incompatibilities. Mr. Morse asked why there was a 40-minute difference. Mr. Riley responded that the wrong TLE was sent. Mr. Harris reported that there is one open Discrepancy Report (DR) which will be closed based on NSG discussions. There is no VHF open work.

WALLOPS RANGE STATUS

Mr. Mark Lamberson presented the Wallops Range Operations Contract (ROC) status (refer to the presentation, *Wallops Range Operation Contract Status*). Mr. Lamberson reported that, post Space Shuttle, there have been no hardware or software changes. There are no open DRs or open work. He noted that Range DRs are now available online. Facilities are Green. Mr. Lamberson provided a list of Points-of-Contact (POC). Mr. Morse asked if Commercial Orbital

Transportation System (COTS) activities are worked through Mr. Jim Bangerter. Mr. Lamberson replied that the Range is preparing for its first Taurus launch in February. The Range will be deploying assets to Bermuda. Mr. Morse asked why the process is not being worked through the HSF Network Director (ND). Mr. Lamberson stated that that discussion would have to be with Mr. Steve Kremer. Mr. Morse remarked that other missions including SLS are interested in the Range, the deployable assets and Bermuda. He stated that the coordination of the support needs to get back into the standard flow via the HSF ND.

DFRC STATUS

Mr. Mike Yettaw provided a Dryden Flight Research Facility (DFRC) status (refer to the presentation, *DFRC Range Status*). Mr. Yettaw reported that during the last two ISS missions there were some support issues. DFRC replaced an unstable computer to mitigate the flip mode problem experienced in August. Noise was then experienced during the September support. The problem was tracked to power line noise; three insulators were replaced. Issues still exist and more insulators will probably be replaced. In August, it was realized, that if one computer goes down prior to the support, it creates a problem. DFRC has added computers. Mr. Yettaw reported that the satellite T-1 service has been removed. There is now no NTR diversity. Services were moved to a terrestrial link. Transponder 5 video support will be decommissioned in December. A smaller video dish will be installed. Mr. Yettaw reviewed the DFRC systems that will be maintained post Space Shuttle. There will be no change to the radar and telemetry systems. DFRC does have a mobile asset available that provides L- and S-band uplink; C-, L-, and S-band receive capability; and two Ultra High Frequency (UHF)/VHF radios. The communications facility will remain the same. ISS support systems will remain the same. Long range Optics (LRO) will be available. Mr. Morse stated that there is interest in the mobile C-band asset. Mr. Yettaw reviewed the circumstances of a fire at one of its sites. Connectivity was lost for 15 – 16 hours. GSFC Comm Control was notified. Mr. Bangerter stated that he did not know and it is probable that the GSFC SMMs and JSC did not know. He started that he is concerned over the lack of communication. He stated that he would like Ms. Melissa Blizzard contacted when this type of outage occurs. Mr. Yettaw stated that he will add Ms. Blizzard to the RCO contact list. He asked that GSFC Comm Control consider the lost assets when a whole site is down. This was critical communications. He stated that he will be meeting with CSO and DFRC to close the communications gap. Ms. Sharon Damiano noted that the GSFC Goddard Comm Control (GCC) did send out a notice when the site went down and when it returned to service. The notice went out via the MONS.

KFRL STATUS

Mr. John Steffes provided a KFRL status (refer to the presentation, *KFLR Status/Future Plans*). Mr. Steffes stated that a lot work was put into KFRL and he has an action to contact Mr. Mark Seibert to discuss its future. Mr. Seibert has not responded. Mr. Steffes reported that NASCOM Switches and Small Conversion devices were removed from MILA and are currently stored in CD&SC and could be re-purposed for future support. He would like to see KFRL kept and not disassembled. He would like to keep the action item open until KFRL can be adapted to the next project. KFRL can be adapted to almost any system. He stated that the system contains near

cutting edge equipment that is currently available for immediate post Shuttle fly-out use and is compatible over broad areas of telecommunication environments; will easily leverage automation of telecommunication operations and provide other enhancements involving existing NASCOM segments and experimental ground communication services; has no attendant procurement costs associated with use of the KFRL other than re-interfacing it to existing or new telecommunications services and adding additional Comdec bit rate provision; and along with other related mission control assets such as serial encryption provided in the adjacent Secure Comm Vault, is ideally positioned for forward program modal use. The Comdec unit is the heart of the system and would need retooling. The MILA forward and return link elements have been decommissioned. Both labs in the Orbiter Processing Facilities (OPF) are to be decommissioned post Shuttle program. KFRL is currently a serial system, but it can be adapted to IP if required. The KFRL and attendant subsystems represent a viable solution for Program of Record (POR) implementation. Mr. Morse stated that this approach is 180 degrees out from Agency policy. This is a design capability that is not consistent with policy. KFRL is supported, but the other capabilities are not. An integrated capability is needed. Mr. Steffes stated that he agrees, but KFRL has demonstrated additional capabilities. Mr. Morse stated that he supports the local test capability, but not as a declaration of launch readiness. Mr. Steffes stated that some of the capability is only testing and that it is posed for mission support. Memorandums of Agreement (MOU) would have to be developed. The IT security will be kept intact and in suspense. He stated that KFRL activity will continue when there is direction.

EXPEDITION 29/30 OVERVIEW

Mr. Ubaldo Garcia provided an Expedition 29/30 overview (refer to the presentation, *Expedition 29 & 30*). The Expedition 29 and 30 timeframe began with the 26S Soyuz departure on September 16, 2011 and is scheduled to end in March 2012. An expedition is characterized by visiting vehicles, logistics, transfer of supplies to and from various vehicles, and Avionics and Software updates. Visiting vehicles consist of two Soyuz, 28S which arrives with the remainder of the Expedition 29 crew in November 16, and 29S which will bring the rest of the Expedition 30 crew in December. Other vehicles/activities during the timeframe are two Progress resupply vehicles, SpaceX/Dragon, Orbital/Cygnus D1, and the 28S undock. Mr. Garcia provided an overview of the crews. He provided an overview of the history of the Increment patches. Mr. Garcia reviewed the Increment 29/30 2011/2012 Significant Events time line.

NACAIT

Mr. Mike Fanders gave a Network and Communications Analysis and Integration Team (NACAIT) status (refer to the presentation, *NACAIT Status*). The Canadian Space Agency (CSA) is in full-up Space Station Remote Manipulator System (SSRMS) support. Four channel ISS video is operational; however, CSA has reported locking up on the new Amino boxes. NISN Engineering is tracking the problem with a Trouble Ticket. The locking up does not directly impact operations. The Japan Aerospace Exploration Agency (JAXA) HTV OCS – HTV-3 test will be no earlier than February 2102. The European Space Agency (ESA) Columbus lab is in full operation. ATV-3 is scheduled for launch no earlier than February 29, 2012. The Agenzia Spaziale Italiana (ASI) is full Permanent Multipurpose Module (PMM) operations. The gateway

is prime for SWIFT. The gateway will be modified for NuSTAR. The Russian Space Agency (RSA) MCC-M LAN upgrade is complete. Mission services network redesign optimization continues. The SpaceX Demo 2/3 launch is no earlier than January 2012. This is no Mission Operations Directorate (MOD) date. The Orbital-Cygnus launch is no earlier than May 2012. The MPCV tests are now referred to as Exploration Flight Tests (EFT). EFT-1 is no earlier than October 2013. Baseline requirements are being collected. The requirements document will be the Draft PRD (DPRD). The document will be released in mid November. The program will utilize Low Density Parity Check (LDPC). JSC would like to talk to WSC on the use of LDPC. EFT-1 will use a stand-alone box. There will be no schedulable services until SGSS. Mr. Aquino suggested a working group on MPCV at the next NSG. Mr. Fanders reviewed the MPCV interfaces diagram. MPCV will interact with SCIO as HSF did. Interfaces will be maintained with the HSF ND and NIMO. JSC does not want MPCV going to the support elements independently. The question was raised as to how CSO NISN will be used. The statement was made that NISN will probably provide infrastructure. CSO was asked to clarify the use of CSO vs. NISN.

MPCV OVERVIEW

Mr. Mike Marsh provided an MPCV overview (refer to the presentation, *MPCV Overview*). Mr. Marsh stated that the presentation contains ITAR information. The MPCV presentation is available by request on; please contact Mr. Jim Bangerter.

A. MPCV is managed at JSC. Orion and crew module are used as names for the vehicle. SLS is managed by the Marshall Space Flight Center (MSFC). NASA Authorization Act of 2010 directs NASA to develop an MPCV with minimum requirements that it must be able to achieve. The SLS vehicle will be able to meet specified in the NASA Authorization Act of 2010. MPCV will build several vehicles.
B. EFT-1 is the new module test vehicle and will have a unique communications system. EFT-1, formerly Orion Flight Test-1 (OFT-1) is the second major flight test for the MPCV program; Pad Abort Test-1 demonstrated a development version of the Launch Abort System (LAS) on May 6, 2010 at the White Sands Missile Range (WSMR). Ascent Abort Test-2 (AA-2) is in the planning stage to occur at Cape Canaveral Air Force Station (CCAFS). There is a decision to be made as to which test will occur first.
C. The EFT-1 vehicle consists of a Crew Module (CM), a Service Module (SM) and an LAS; only the CM will be active for the EFT-1 flight. The EFT-1 will launch on a Delta IV-Heavy Expendable Launch Vehicle (ELV) with insertion into an elliptical orbit for the first revolution, and then the Delta upper-stage will boost the EFT-1 into a high apogee trajectory to maximize velocity at entry interface. All EFT-1 maneuvers and mission event sequences are fully automated. There will be the capability to command, but it will not be exercised. Discussions are underway to try to figure out how to send a test command to see how the encryption keys will work.
D. EFT-1 will operate in the non-coherent transponder mode. There will be no TDRS-Z support because of the lack of LDPC capability. JSC Ground Controllers (GC) are working with WSC to create a Spacecraft Identification Code (SIC), configuration codes for TDRS scheduling. Launch operations will be executed from the Operations and

Checkout (O&C) building at KSC. Flight operations (including in-flight contingency commanding) will be executed from the MCC at JSC. Mr. Marriott stated that a video requirement is being developed. The RTSs will be used. Mr. Morse asked if a relationship is being formed with the Air Force Satellite Control Network (AFSCN). Mr. Bangerter stated that this may be accomplished via Lockheed Martin. The program wants 2 hours of light after landing to recover the spacecraft. Two TDRS links are being discussed. Mr. Morse asked what he strategy is leading into the launch window. Mr. Bangerter stated that, possibly, continuous time will be scheduled. Mr. Aquino stated that it would be similar to a Space Shuttle 2-hour launch window. This is one mission and there will be no MA; S-band only.

E. Mr. Bangerter stated that a loading study is needed.

F. The Delta-IV requirements are needed as well. No tracking data will be required if launched prior to SGSS. The vehicle will have a GPS on board. There are no plans for UPDs on the forward or return links. Mr. Marriott stated that a procedure is needed for the manual Ground Control Message Requests (GCMR). Mr. Bangerter stated that the NIMO contractors will write the test plans. GSFC is still waiting on funds from the program. There is no C-band requirement. FDF can provide prelaunch predicts. However, we are assuming 5 C-band passes as with other new programs demo flights. There is also no formal ESTL role yet.

G. Mr. Marsh reviewed the Centers/Locations supporting EFT-1 network testing, sims, and the mission. Mr. Marsh provided a detailed design overview for command. Telemetry data, weather, video, voice, file downlink, Countdown/Count-up (Mission Elapsed time [MET]) Timing, launch operations, and flight operations.

NSG ACTION ITEM WRAP UP

Two action items were assigned at the October 20, 2011, Main Forum of the NSG.

102011-NSG-01	Angela Culley/ GSFC/CSO	Provide copies of the CSO PSLAs to Mr. Gary Morse.		Ms. Culley has completed her action.	**Closed**
102011-NSG-02	GC Office	Talk to their customers (primarily ATV, HTV, SpaceX Dragon, and OSC Cygnus) to determine if they REQUIRE Command Echo in the future, and what impacts would result if the capability was not available through the Space Network. Note-not assigned at the actual Main Forum, but as a result of HSF ND discussions at the NSG.	11/15/11		**Open**

CLOSING REMARKS

Mr. Bangerter thanked the attendees for their participation at the October 2011 NSG. The next NSG is tentatively scheduled for the September 2012 time frame.

Network Support Group Acronyms and Abbreviations

AA	Ascent Abort
AFSCN	Air Force Satellite Control Network
AI	Action Item
AOS	Acquisition of Signal
ASI	Agenzia Spaziale Italiana
ATV	Automated Transfer Vehicle
CCAFS	Cape Canaveral Air Force Station
CCB	Configuration Control Board
CM	Crew Module
COTS	Commercial Orbital Transportation System
CSA	Canadian Space Agency
CSO	Communication Service Office
CSR	Customer Service Representative
DB	Database
DFRC	Dryden Flight Research Center
DPRD	Draft PRD
DR	Discrepancy Report
DSR	Daily Summary Report
EC	Engineering Change
EFT	Exploration Flight Test
ELV	Expendable Launch Vehicle
ENS	Emergency Notification and Accountability System
ER	Eastern Range
ESA	European Space Agency
ESD	Electrostatic Discharge
ESTL	Electronic Systems Test Laboratory
FDF	Flight Dynamics Facility
FEPR	Front End Processor Replacement
FER	Freeze Exemption Request
FY	Fiscal Year
GC	Ground Controller
GCC	Goddard Comm Control
GCMR	Ground Control Message Request
GRGT	Guam Remote Ground Terminal
GSFC	Goddard Space Flight Center
HDR	High Data Rate
HSF	Human Spaceflight

Network Support Group Acronyms and Abbreviations

HSFC	Human Spaceflight Comm
HTV	H-II Transfer Vehicle
IIRV	Improved Inter-range Vector
IN	Integrated Network
ISI	Interim Support Instruction
ISS	International Space Station
ITCD	Information Technology & Communications Directorate
JAXA	Japan Aerospace Exploration Agency
JSC	Johnson Space Center
KSC	Kennedy Space Center
KTS	Kennedy Tracking Station
LAN	Local Area Network
LAS	Launch Abort System
LDPC	Low Density Parity Check
LRO	Long Range Optics
MA	Multiple Access
M&C	Monitor & Control
MCC	Mission Control Center
MET	Mission Elapsed Time
MFR	Multi-function Receiver
MIDDS	Meteorological Interactive Data Display System
MILA	Merritt Island Launch Annex
MOD	Mission Operations Directorate
MONS	Mission Outage Notifications
MOU	Memorandum of Agreement
MOVE	Mission Operations Voice Enhancement
MPCV	Multi Purpose Crew Vehicle
MSFC	Marshall Space Flight Center
MSON	Mission Service Outage Notification
NACAIT	Network and Communications Analysis and Integration Team
NAM	Network Advisory Message
NASA	National Aeronautics and Space Administration
NCCDS	Network Control Center Data System
ND	Network Director
NICS	NASA Integrated Communications Services contract
NIMO	Networks Integration Management Office

Network Support Group Acronyms and Abbreviations

NISN	NASA Integrated Services Network
NOAA	National Oceanic and Atmospheric Administration
NOSP	Network Operations Support Plan
NSG	Network Support Group
NSR	NISN Service Request
O&C	Operations and Checkout
ODAR	Obsolescence-Driven Avionics Redesign
OPF	Orbiter Processing Facility
ORR	Operational Readiness Review
OTF	Orion Test Flight
PDL	Ponce de Leon
PMM	Permanent Multipurpose Module
POC	Point-of-contact
POR	Program of Record
PRD	Program Requirements Document
PSLA	Project Service Level Agreement
RAIL	Rolling Action Item List
RFA	Request for Action
ROC	Range Operations Contract
RSA	Russian Space Agency
RTS	Remote Tracking Site
SA	Single Access
SAFS	Standard Autonomous File Server
SCaN	Space Communications and Navigation
SCNS	Space Communications Network Services
SGLT	Space-to-Ground Link Terminal
SGSS	SN Ground Segment Sustainment
SIC	Spacecraft Identification Code
SLA	Service Level Agreement
SLS	Space Launch System
SM	Service Module
SMM	Spaceflight Mission Managers
SN	Space Network
SSP	Space Shuttle Program
SSRMS	Space Station Remote Manipulator System
STGT	Second TDRSS Ground Terminal
TDRS	Tracking and Data Relay Satellite
TDRSS	Tracking and Data Relay Satellite System

Network Support Group Acronyms and Abbreviations

TLE	Two Line Element
TNOSP	TDRSS NOSP
TO&A	Technical Operation and Analysis
TOCC	TDRS Operations Control Center
TOPO	Trajectory Operations Officer
TWTA	Traveling Wave Tube Amplifier
UHF	Ultra High Frequency
VHF	Very High Frequency
VV	Visiting Vehicle
WAN	Wide Area Network
WG	Working Group
WGS	Wallops Ground Station
WSC	White Sands Complex
WSGT	White Sands Ground Terminal
WSMR	White Sands Missile Range