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

April 19, 2012

The Dragon Capsule

The Cygnus Pressurized Cargo Module is based on the MPLM currently in use on the ISS

The primary structure of the Dream Chaser S/C undergoing testing at the University of Colorado

Human Spaceflight (HSF)
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April 19, 2012

Johnson Space Center (JSC), TX

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

Network Support Group Contents

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Network Support Group Attendance

The attendees listed below attended all or part of the April 16 – April 19, 2011 NSG (splinter sessions and/or main forum).

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Network Support Group Minutes

INTRODUCTION

Mr. Jim Bangerter convened the April 19, 2012, 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 thanked Mr. Earl Baum for his support in coordinating logistics for the meeting.

April 2012 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 ROLLING ACTION ITEM LIST (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 8 meetings with open Action Items (AI) for a total of 10 open items, 9 over due items, and 7 meetings with overdue items. Mr. Testoff reviewed the open action items:

A. Action Item 120209-OSC COMPAT-02. This item is now due 30 days from the NSG. Mr. Bangerter stated that he would talk with Ms. Shashi Gowda on this action item. This action item remains **OPEN**.
B. Action Item 0910-NSG-ECC-02. Mr. Bangerter discussed this topic with Mr. Mike Bielucki at the White Sands Complex (WSC). Mr. Bielucki owes Mr. Bangerter a position statement. The results of the study have been presented. It has been agreed that the eccentricity will not be increased at this time. This action item remains **OPEN**.
C. Action Item 101811-OSC-01. It was determined during the NSG Orbital Sciences Corporation (OSC) Splinter discussions with the Goddard Space Flight Center (GSFC) Flight Dynamics Facility (FDF) that it would be best to leave the requirement as is to document FDF's requirement on the Program and Eastern Range (ER) to provide Launch Trajectory Acquisition System (LTAS) data. Mr. Turonald Banks will be updating the requirement to reference the OSC Antares Program vs. the OSC Taurus -II Program as requested. This action item has been **CLOSED**.
D. Action Item 102011-NSG-02. The Space Network (SN) Ground Segment Sustainment (SGSS) Command (CMD) Echo issue is in work. The SGSS project is aware of the importance of CMD echo. This action item has been **CLOSED**.
E. Action Item 112811-CCDev-01. Mr. Bangerter will follow up on this action item. This action item remains **OPEN**.
F. Action Item 112811-CCDev-02. Mr. Bangerter will follow up on this action item. The Launch Vehicle (LV) has been decided on. This action item remains **OPEN**.
G. Action Item 012412-CC Dev-01. Mr. Bangerter has spoken to Mr. Lintereur on due dates. The date has moved to 2015. Dates will be added to the closure of this item. This action item has been **CLOSED**.

H. Action Item 030612-25Mbps Testing-01. The fix will be ready in June or July for Autotrack. Mr. David Glasscock was asked to determine when the fix would be delivered. The software is for Tracking and Data Relay Satellite (TDRS)-H/I/J. There is no impact to 25-Mbps testing. A Briefing Message (BM) has been transmitted. WSC has agreed that there will be no testing until the software is verified. This action item remains **OPEN**.

I. Action Item 030612-25Mbps Testing-02. Mr. Moore talked with a P3 Tracking and Data Relay Satellite System (TDRSS) Analyst (TA) Engineer (Len Vaught) and the K-band Single Access Return (KSAR) Autotrack Check was once in their P3 Test Procedure, it isn't any more. Len said he will bring this subject up in their TA meeting. This is doable during a P3 Test. Lynn reported the TAs will incorporate Autotrack Checks into P3 testing. This action item is **CLOSED**.

J. Soyuz-30 MORR-01. Mr. Bangerter stated that the Very High Frequency (VHF)-1 system is expected to be Yellow by the end of the month. There are separate action items for the VHF spectrum issue and a risk has been opened. This action item remains **OPEN**.

HSF DOCUMENTATION STATUS

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

A. Mr. Daniel reviewed a Documentation Update Effort Workflow diagram. This is a simple diagram of the process to create or update a document. There are 3 separate review cycles. Each results in a rework cycle due to changes or input.

B. Mr. Daniel reviewed the Documentation Data Workflow diagram. This is a diagram of how information on documents created or updated is tracked.

C. Mr. Daniel provided a quick overview of the different levels of document review conducted for Integrated Network (IN) HSF documents. Team review is the first review and the document is sent GSFC to the team only. General review is the second review and the document is sent to the IN. Configuration Control Board (CCB) review is the third review. This review is conducted by Mr. Steven Testoff of the Networks Integration Management Office (NIMO). An email is distributed and the document is posted online on the Next Generation Integrated Network (NGIN) online system. The CCB is an approval cycle; the document should have been fully reviewed during the General review prior to the CCB.

D. Mr. Daniel reviewed the documents published since the last NSG (October 2011). Four documents were published. The Automated Transfer Vehicle (ATV) Annex to the ISS TDRSS Network Operations Support Plan (TNOSP) was published as a Working Copy. It was noted that this should be updated to include the current mission. Mr. Tom Russell accepted an action item that while updating the ATV Annex; update the document for both the ATV-3 and -4 missions (action item 0412-NSG Main Forum-01).

E. Mr. Daniel reported that there are no documents in CCB at this time.

F. Mr. Daniel reviewed the documents in General review. Two documents are in General review.

G. Mr. Daniel reviewed the documents in Local (Team) review. Mr. Scott Greatorex is reviewing the DRAFT of the *Configuration Management Freeze Policy for the Integrated Networks and Support Elements*, 450-CMFP-HSF/ELV, Revision 1. A new number is being assigned to this document.
H. Mr. Daniel reviewed the document updates on hold or not started. These are documents whose schedules have slipped or are low priority. There are 7 documents on the list.
I. Mr. Daniel reviewed the planned updates for the next Fiscal Year (FY). The list of documents is based on priority, funding, and resources. The list provides the final completion date and the names of the Subject Matter Expert (SME) (Spaceflight Mission Manager [SMM]) responsible for coordinating the task.
J. Mr. Daniel noted that a Multi Purpose Crew Vehicle (MPCV) and Exploration Test Flight (EFT) document is in discussion.
K. Mr. Daniel asked that the elements use this information as a planning tool to schedule the effort of their personnel.

NSG SPLINTER SESSION SUMMARIES

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

A. Network Protocol [Restricted Meeting]. Mr. Erik Richards provided a Network Protocol splinter summary (refer to the presentation, *Network Protocol Working Group*). This meeting consisted of two parts: 1) voice protocols and 2) a discussion of delogs. Voice, Ground Configuration Message Request (GCMR) management, and problem reporting protocol during all phases of a mission were discussed. The process, parameters, and time constraints of WSC delogs were discussed. An agreement was made on GCMR protocols and the protocols will be documented in an Interim Support Instruction (ISI). One action item was assigned to Mr. Rick Kraesig.
B. SN Database. Mr. Erick Richards provided an SN Database splinter summary (refer to the presentation, *Space Network [SN] database Status*). The purpose of the meeting was to provide a status of the Database Change Request Forms (DBCR) and database processes improvement. The SMMs are working with the WSC Test Operations and Analysis (TO&A) group. Mr. Mike Miller will implement the changes on the NCC Database System (NCCDS). The Johnson Space Center (JSC) will then be able to use the SN Access System (SNAS). The new forms were reviewed and have been well received. The forms will be updated and loaded to NGIN. Configuration Management (CM) of the forms will be via the WSC CM organization.
C. CCDev. Mr. Jim Bangerter provided a CCDev splinter summary (no presentation). The splinter provided an overview of the customers and plans for JSC Mission Operations Directorate (MOD). Mr. Gary Morse asked if Space Act Agreements (SAA) were discussed. He stated that he has a concern entering into agreements that include Space Communications and Navigation (SCaN) assets. SCaN negations are up to SCaN. This topic will be discussed at JSC. Private companies want 'one-stop shopping'. Mr. Morse stated that he wants these companies to come to him and Mr. Bangerter in regards to SCaN assets. Mr. Bangerter replied that there is the *Network Operations Directive for*

Human Space Flight Network Support, 450-NOD/HS that includes processes. The National Aeronautics and Space Administration (NASA) is now in the commercial era. MOD cannot market the assets without agreements and negotiators with SCaN. Messrs. Gary Morse and Joe Aquino agreed with Mr. Bangerter. Mr. Morse asked if a Memorandum of Agreement (MOU) is required. Mr. Scott Douglas asked if MOD is the agent for commercial projects or are they to negotiate with SCaN and the Communications Service Office (CSO) on their own. Mr. Morse stated that everyone needs to be in agreement on how to operate.

D. Obsolescence Driven Avionics redesign (ODAR) Status (refer to the presentation, *ODAR Splinter Summary*). Mr. Bangerter reviewed a list of dates provided by Ms. Aldora Louw. He stated that the attendees reviewed the transition plan.
E. EFT-1 Database. Mr. Melvin Calhoun provided an EFT-1 splinter summary (refer to the presentation, *Exploration Flight Test [EFT-1] Database Working Group Splinter Summary*). The purpose of the meeting was to set up the SN database in support of the EFT-1 mission. Support Identifiers (SUPIDEN) were selected in support of the MPCV program. Orion will use the 2200 series. Space Launch System (SLS) will use the 3350 series. Service Specification Codes (SSC) were populated to support S-band Single Access Forward (SSAF) and S-band Single Access Return (SSAR). Mr. John Hudiburg stated that the SLS team is looking into using the Delta upper stage as part of the SLS. A separate link would be needed. Mr. Bangerter stated that there are two SUPIDEN for each SLS vehicle. There may already be a SUPIDEN for the Delta. No action items were assigned.
F. H-II Transfer Vehicle (HTV)-3 Mission Readiness. Mr. Melvin Calhoun provided an HTV-3 splinter summary (refer to the presentation, *H-II Transfer Vehicle-3 [HTV] Mission Readiness Splinter Summary*). The purpose of the meeting was to provide an HTV-3 mission update. HTV-3 is scheduled to launch July 2012. The Marshall Space Flight Center (MSFC) is scheduled to receive a Small Conversion Device (SCD) with upgraded software. There will be a retest of the Backup Control Center (BCC) – Huntsville Operations Support Center (HOSC) with the Japan Aerospace Exploration Agency (JAXA) in May and then again in June. The HTV NOSP is scheduled to be completed in May. No action items were assigned.
G. HSF Comm Working Group (WG). Mr. Michael Thomas provided an HSF Comm WG splinter summary (refer to the presentation, *Human Space Flight Working Group*). Mr. Thomas provided updates for upcoming NASA Integrated Communications Services (NICS) contract upgrades, outages, and activities. Mr. Thomas provided NASA Integrated Services Network (NISN) Service Requests (NSR) updates. ISS video NSR updates: 1) NSR 37104-The Corporate Network Operations Center (CNOC) is working with the customer on the Multi-cast issue; 2) NSR 37135-the Customer Service Representative (CSR) has a meeting scheduled with engineering and CNOC to clarify the requirements; 3) NSR 37171-the CSR has scheduled a meeting to discuss options of purchasing the Amino A150 set-top boxes (the need date is May 21). Wide Area Network (WAN) NSR update to NSR 36178-an HSF meeting was held April 18 and funding is being trickled down to Mr. Vic Colaluca at the Kennedy Space Center (KSC).

Mr. Colaluca is aware of this and is working on an estimated date of completion. MPCV/Orion support NSR 36723 update-AT&T confirmed delivery of the circuits. In-house cabling is underway. Mr. Thomas reviewed the three action items assigned and stated that all have been closed.

H. VHF Status. Mr. Fred Pifer provided a VHF status splinter summary (refer to the presentation, *International Space Station [ISS]/Soyuz Very High Frequency [VHF] Status Splinter Group Summary*). The purpose of the meeting was to review stations contingency/emergency communications support. VHF-1 uplink radiation is restricted pending license renewal by the JSC Frequency Manager. The date is To Be Determined (TBD). Mr. Morse asked how this occurred. Mr. Bangerter stated that the license was issued for a long period of time and the persons who knew the expiration data had retired. It was an oversight. JSC is responsible for the license and Ms. Cathy Sham is handling the renewal. Mr. Morse stated that the dates need to be watched. Should the service be needed, it will have to be used. Mr. Bangerter stated that hooks will be put in place to remind the Network to renew the licenses. Ms. Sham is providing status. The requests have been submitted and are in review. WSC is putting upgrades in place and the 20-degree elevation restriction will be reviewed. A new site noise level survey will be conducted. Proposed station proficiency simulations were discussed. The procedure will be documented in the updated TNOSP. A pass will be scheduled with the ISS (no uplink or downlink); the procedures will be followed; stations will be advised this is a simulation; and they stations will radiate into a dummy load. This process was followed on the Near Earth Network (NEN) and worked well. VHF Private Conversations were discussed. The WSC communications is tied into the Mission Operations Voice Enhancement (MOVE) system. MOVE cannot cancel recordings. Options are being explored on how to meet the requirement that all audio monitoring and recording is to be terminated for Private Conversations. Mr. Douglas stated that a conference can be removed from the stream going into the recorder. Mr. Bangerter asked that Mr. Douglas provide a formal response. Mr. Douglas stated that he will have a team provide a recommended procedure. Mr. Bob Marriott stated that Private Conversations should be a part of the proficiency simulations. Mr. Pifer reviewed the three action items. (Editor's Note: Action Items 01 and 02 have been **CLOSED**.)

I. Soyuz-30/31 Mission Planning. Mr. Pifer provided a Soyuz mission planning splinter summary (refer to the presentation, *Soyuz-30/31 Mission Planning*). Mr. Pifer provided an overview of current and future missions. During the splinter he reviewed the premission, launch, and early orbit activities. Support for the upcoming missions is nominal. Soyuz undocking and landing support was reviewed. No action items were assigned. Mr. Morse stated there have been no changes in plans for C-band support for the upcoming missions. Mr. Bangerter concurred.

J. Network Operations Directive (NOD), Revision 4 Review. Mr. Bob Marriott provided a NOD, Revision 4 review splinter summary (refer to the presentation, *Network Operations Directive [NOD] Revision 4 Splinter Meeting*). Revision 4 was initiated in August 2011 and a General review started in January 2012. Sections for SLS and Exploration Missions (EM) 1 and 2 will be added. The splinter identified Points-of-Contact (POC)

for section and paragraphs. Mr. Eric Barcon is the POC for the Ground System Development Office (GSDO). A concurrence was reached on the document organization. Mr. Douglas stated that CSO should be a signatory or provide concurrence on the signature page. Mr. Marriott agreed and Ms. Beth Paschall will be added. The NOD does not provide detailed procedures or requirements, but defines the framework and network operations structure used to define, manage, and implement requirement in support of HSF mission objectives. Mr. Marriott reviewed some of the changes to the document. Development and testing will be added in to the definition of HSF. Mr. Marriott reviewed the HSF IN Network Organizations and the Space Communications Integration Office (SCIO) Integration of Human Exploration Operations (HEO) / HSF Services diagrams. The Air Force Satellite Control Network (AFSCN) was retained in the document should their services be required in the future. Mr. Morse noted that a TEL-IV requirement is being worked. Section 2 provides role and responsibilities. Mr. Morse stated that the Glenn Research Center (GRC) role has yet to be defined. Ms. Angela Culley will be the POC for CSO for review and changes to the NOD. Input will come from Mr. Scott Douglas, Acting Mission Ops Manager and Ms. Heather Kobin, Mission Services Manager. Mr. Marriott reviewed the GSFC structure for providing Mission and Data Services and the CSO Data Service Management Structure HEO / HSF Mission figures. Mr. Morse stated that Commercial Orbital Transportation System (COTS) is migrating into the CCDev. The Jet Propulsion Laboratory (JPL) wants to expand Development Test Facility (DTF)-21. This is a compatibility testing capability similar to GSFC's. Changes and inputs will be collected and the document will go through CCB approval and be published. Late changes can be handled via Documentation Change Notice (DCN) if signatories agree.

K. Automated Support Requirements System (ASRS) Status. Mr. Eric Barcon provided an ASRS splinter summary (refer to the presentation, *Automated Support Requirements System [ASRS] Status Splinter Summary*). Mr. Barcon is the manager of ASRS which produced the Program Requirements Documents (PRD). The ASRS annual management meeting was held in March. ASRS is now in the KSC Ground Processing (GP) directorate currently funded by the Space Shuttle Program (SSP) Transition and Retirement (T&R) supported by the Space Programs Operations Contract (SPOC). ASRS will transfer from SPOC to Test and Operations Support Contract (TOSC). Transition will begin January 2013. Tools will transfer in January or February. The transition should be transparent. The SSP PRDs are **CLOSED** except the KPRD. The KPRD was scrubbed and is being used to support T&R activities. MPCV/Orion/EFT-1 documents are in work. The parent documents are the JSC Mission Support Requirements Document (MSRD) and Lockheed Martin (LM) Launch Site Support Requirements (LSSR). At this time, the MSRD is more mature than the LSSR. Mr. Morse asked if Mr. Barcon was aware of the driver to stay with the PRDs, which he is an advocate of. He asked if factors were the Universal Documentation System (UDS) and the relationship with the Air Force (AF). Mr. Barcon replied that that was a factor. The system provides a good common language, a tool that can be used across the centers, and provides a shared capability that helps suppliers in receipt of requests. Mr. Morse

asked if the Webb-McNamara Agreement was a driver. Mr. Barcon stated that it started with the agreement between NASA and the Range Commanders Council. The process has been polished over the years. A SRS and PRDs have worked very well. Mr. Morse commented that this has been very helpful as there has been some push-back for using ASRS. Mr. Barcon commented that his full presentation has a history and agreed to send the presentation to Mr. Morse.

L. ATV-3 Mission Status. Mr. Tom Russell provided an ATV-3 mission status splinter summary (refer to the presentation, *Automated Transfer Vehicle – 3 [ATV-3] Mission Status Splinter Summary).* The purpose of the meeting was to discuss ATV-3 IN support. Discussion at the meeting included Launch and Early Orbit (LEOP) support, network issues, Lessons Learned, undocking and re-entry, and the test configuration for ATV-4 System Validation Testing (SVT)-1 that will be conducted during the ATV-3 mission. A separate Spacecraft Identification Code (SIC) will be needed so that there is no interference between ATV-3 and ATV-4 testing. Two action items were assigned.

M. SN Human Error Management. Mr. Mike Nichols provided an SN Error Management splinter summary (no presentation was provided). There have been issues with Operator Errors (OE). WSC looked at other disciplines to find ways to help the SN correct its OEs. The SN looked at the medical field and nuclear power plant operations. The SN is now socializing 14 tools from nuclear power plant operations. The SN has seen a 20 percent reduction in OEs so far. WSC also looked at infrastructure items such as lighting in the TDRSS Operations Control Center (TOCC), chairs, displays, and headset use. Mr. Morse asked if rotating shifts was reviewed. Mr. Nichols stated that the shifts and crew fatigue were reviewed and under the new contract a change was made to rotating every 56 days. There are two basic shifts. Mr. Morse stated that one important factor is shift duration. Mr. Nichols stated that a big factor was the amount of activity on a shift. There is a large amount of activity on the day shift. TDRS-K testing is conducted on the day shift and User Service Subsystem Component Replacement (USSCR) testing is being moved to the night shift.

N. EFT-1 Overview. Mr. Mike Marsh provided an EFT-1 Overview splinter summary (refer to the presentation, *EFT-1 Overview Splinter Summary*). The purpose of the meeting was to provide an overview of the EFT-1 mission and testing.

1. There are twenty-four voice loops that could be extended to the centers. An action item was accepted to identify the voice loops. Mr. Marsh stated that he wants to send all the voice loops to GSFC.
2. LM is designing the mission. TDRSS satellites and Space-to-Ground Link Terminal (SGLT) locations are not set. Orion operations are set on board the spacecraft. There will be no commanding the spacecraft to change the plan. Mr. Morse asked if there will be uplink changes. Mr. Marriott stated that the entire answer is not known. The operations will be hard coded on board. We do not know how close to launch LM can update the avionics. Mr. Morse asked how wide the launch window is. Mr. Marsh stated that is 3 to 7 hours. The launch window is also under discussion. Mr. Marriott stated that the vehicle will know when launch is and count up.

3. An Electronic Systems Test Laboratory (ES TL) data source replacem ent is needed. Mr. Morse stated th at he though t LM ha d a contract to use its o wn facility. Mr. Marriot responded that the lab is in Denver and NASA cannot schedule the facility. NASA anticipates push back buy LM on use of its facility. Mr. Hudiburg asked if this was an assum ption or does JSC know that there will be push back. Mr. Marriott stated that it is an educated assumption. NASA has had push back in the past. LM does not recognize NASA as having nay requirements on them.
4. Dual SHO capability and codes were discussed.
5. Narrow band (Low Density Pa rity Check [LDPC]) modems were discussed (which SGLTs will be modified for EFT-1). One SGLT will be needed for Denver; two will be needed for the m ission. USS CR m odifies SLGTs 4/5 (both at the White Sands Ground Terminal [WSGT]). This configurat ion is the one desire d by JSC. If USS CR is on schedule, the autom ated modems can be used vice having to m anually configure the modems.
6. The configuration and num ber of Serial C onversion Processors (SCP) needed to be able to sup port ISS a nd EFT-1 activ ities simultaneously was discussed. The possibility of adding a fourth SCP at each ground terminal was discussed.
7. Flight Rules and docum ent capability vice minimum equipment lists was discussed. Mr. Morse asked why not state single fault to lerance. Mr. Marsh stated that the rule s will be similar to Space Shuttle. M r. Marriott stated that it is too early to know the granularity needed in the Flight Rules. Mr . Bangerter stated that the set of Flight Rules being discussed are only for EFT-1 and the expectation is that a new set will be written when the vehicle is crewed.
8. GSFC support for Denver Live Sky testing was discussed. GSFC is not yet involved; the NOSP is not written. There is no funding.
9. Five action items were assigned.

O. Future of Networks Message Distributi on. Mr. Pepper Powers provided a Goddard Communications Center (GCC) - Com prehensive Discrepancy System (CDS) splinter summary (refer to the presen tation, the *Future of Networks Message Distribution Summary*). The purpose of the meeting was to discuss upcoming changes to the CDS and GCC that will affect ho w network messages are distributed. CDS is being m odified to generate and deliver network operations messages (Briefing Messages [BM], ISI's, Network Advisory Mess ages [NAM], etc) out side of the GCC. CDS will be network-centric. Other projects will not use the CDS. Mr. Marrio tt stated that a new m ethod of transmission is needed. Mr. Powers stated that there will be a new and easier method. In the future, only network elements will u se the CDS. Other projects such as JPSS and LDCM will not. Mr. Morse sta ted that NASA HQ is de veloping a W eb Portal. The portal will offer tools, documents for each m ission, etc. The m issions will have access. The portal will include NGIN. The portal sh ould be ready in the 2014 tim eframe. The GCC will transition to the GSFC FDF control. USSTRATCOM, the major user of GCC, is being asked to fund the GCC. If no funding is found, the GCC wil l be shut down. Ms. Melissa Blizzard stated that the GCC is used by others such as MSFC, KSC

Scheduling. NASA elements not currently part of the CDS use GCC. Two action items were assigned.

P. SN Status. Mr. Bangerter provided an SN Status splinter summary (no presentation). The purpose of the meeting was to provide an overview of TDRS-K testing, USS CR, and SGSS. One of the topics discussed was getting SN customers involved in TDRS-K testing. All presentations were high level and provided schedules.

SN STATUS

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

A. Mr. Glasscock provided a current TDRS fleet status.TD-10 is now TD-W. TD-6 is now stored at 46 degrees West. Mr. Glasscock reviewed the TDRS Constellation Configuration diagram. TDRS-K will be on SGLT-5. The TDRS-K launch is now scheduled for December 2012. WSC received NASA concurrence to relax the TDRS eccentricity requirements. This action was suspended. WSC is waiting on a release from JSC. The TDRS-3 SGL dedicated downlink Traveling Wave Tube Amplifier (TWTA) is failing. NASA has shut off the TDRS-3 SGL KSAR-1 TWTA. Service will be reactivated to support USS CR testing.

B. Mr. Glasscock reviewed the status of WSC hardware. WSC has completed the phone system transition at WSGT and the Second TDRSS Ground Terminal (STGT). Work was stopped on removing Shuttle-unique equipment until a study could be completed to assess how much work, if any, should wait until SGSS and ensure that the task does not impact higher priority work. The study is complete and direction is needed from Mr. Mike Rackley. USS CR implementation is scheduled to begin in July 2012. Antenna Sub-system Controller (SSC) replacement is almost complete. The Operational Readiness Review (ORR) has been held. There was an ISS support anomaly on Guam Data Interface System-Replacement (GDIS-R). WSC has been unable to recreate the anomaly. The anomaly was recreated on SGLT-6, but they were random. WSC has determined that the vendor patch installation has a high risk and is holding off on implementing the patch. WSC is in a cross-patch configuration and will remain so indefinitely.

C. Mr. Glasscock provided a WSC software status. Mr. Bangerter noted that during one delivery period, WSC will be in a Soyuz freeze. Ms. Blizzard stated that WSC will only need to be in a freeze for docking. Mr. Glasscock stated that he will check this with Mr. Rich Romansky. Mr. David Glasscock accepted an action item to provide Mr. Jim Bangerter with an assessment of the WSC 05/15 software delivery (action item 0412-NSG Main Forum-02).

D. Mr. Glasscock provided a TDRS-K/L status. WSC is working on SGLT-5. SGLT-1 and -2 are complete. SGLT-3 and -4 are remaining work. Mr. Bangerter stated that WSC needs to be watchful and not miss submitting Freeze Exemption Requests (FER).

E. Mr. Glasscock provided a WSC VHF status. The new tower and antenna have been installed at the Extended TDRS Ground Terminal (ETGT). The elevation position relay was replaced. The system continues to be Red (Editor's Note: the system is currently Yellow.) WSC continues to work on the CMD echo issue. The camera Engineering

Change (EC) development is pending resolution of the voice anomaly. Mr. Bangerter asked the priority of the CMD echo work. Should the service be needed, this would be a major issue. Ms. Blizzard stated that the issue is being worked. Mr. Bangerter stated that some work at WSC has not had the priority that he would have wished. Mr. Glasscock stated that he has conveyed the importance of this item to engineering. Mr. Bangerter stated that he would like his concern communicated to the station.

WALLOPS GROUND STATION (WGS) STATUS

Mr. Mark Harris presented a WGS status (refer to the presentation, *Wallops 11M/VHF Status*). Wallops continues upgrade work. The S-band and X-band receive equipment has been installed. A new High Power Amplifier (HPA) is being installed. Training is complete. Related software has been installed. Wallops will provide OSC/Cygnus support. Scheduling procedures and real-time procedures are open work. There are no issues with the VHF-1/2 systems. Wallops is conducting Station Readiness Tests (SRT) and there is no open work. There are no open Discrepancy Reports (DR). Building N-162 rood resurfacing work is scheduled for May 2 through June 8. This is during the Soyuz mission. Wallops has informed the vendor that we reserve the right to stop work. Facilities are Green. Staffing levels are sufficient to meet all HSF requirements.

WALLOPS RANGE STATUS

Mr. Mark Lamberson presented the Wallops Range status (refer to the presentation, *Wallops Range Status*). Mr. Lamberson reviewed hardware and software changes since the 2011 NSG. Depot Level Maintenance (DLM) was conducted on radar 5. There are no changes to the 7.3 1 and 2 antennas. The 9M is now FMC for RX operations and is using spares from the Merritt Island Launch Annex (MILA) deactivation. The 8M Antenna Control Unit (ACU) has been replaced with a TCU unit. A 3M RX antenna was installed on the roof of N-162. This replaced one of the two low-gain 2.4M antennas. The Ultra High Frequency (UHF) Canoga antenna system is available if needed. There have been no software changes. Mr. Lamberson reviewed the Wallops OSC/ Antares launch configurations. Coquina is the down-range site. A mobile asset will be deployed to Bermuda. Range equipment is Green. There are no DRs that impact the Range. There is no open work. Facilities are Green. Staffing levels are sufficient to meet all current requirements.

DRYDEN FLIGHT RESEARCH CENTER (DFRC) STATUS

Mr. Russell James presented the DFRC status (refer to the presentation, *Dryden Flight Research Center Western Aeronautical Test Range [WATR]*). DFRC is replacing its radios. It is no longer possible to get parts to repair the current radios. The radios will be replaced with Collins Model 721S. The new radios add Frequency Modulation (FM) capability. The new radios have external PC control software options. This will be an easy implementation. The Digital Integrated Communications Electronic System (DICES) III system vendor can no longer obtain all the components for repair of the system. DFRC will be adding additional Voice over IP (VoIP) end stations. The DICES VoIP end stations will be identical to the existing DICES III end stations. This will be a private stand-alone network. The Comm-3 6M directional antenna

will be taken down in April 2012 to address gearbox issues. Mr. James noted that this contract is slipping. Mr. James provided a DFRC systems overview. DFRC has three fixed telemetry systems. DFRC has two 4.9M C-band radars. DFRC has mobile telemetry systems. Mr. Morse asked if the mobile systems have command capability. Mr. James stated that the S- and L-band systems do. The mobile system has L-, S-, and C-band telemetry and TV downlink capability. It is a 30-foot containerized trailer. Mr. Hudiburg asked how often the asset is used. Mr. James stated that DFRC is getting ready to use the system to support Dream Chaser. DFRC also has a smaller system which is suitcase size with a 4-foot antenna. Mr. Hudiburg asked how available the asset would be for use at the Cape for launch support in 13/14 timeframe. Mr. James stated that it depends on Dream Chaser. Mr. Bangerter stated that the network wants to follow-up with DFRC on the mobile assets. Mr. James stated that the mobile systems have no ranging capability. Mr. James reviewed the communications and VHF systems. He noted that there are no open DRs on the VHF ISS support system. DFRC has Long Range Optics (LRO), camera, and mobile video assets. WATR has two Mission Control Centers that support research and test missions. DFRC also provides Range Safety support and is in the process of upgrading the Range Safety displays. DFRC supports many types of programs and projects including ISS, high performance aircraft, science aircraft, Unmanned Aerial Vehicles (UAV), and space transportation vehicles.

CSO MISSION OPERATIONS STATUS

Mr. Scott Douglas provided a CSO mission operations status (refer to the presentation, *Communications Service Office [CSO] Mission Operations Status*).

A. Through the IT Infrastructure Integration Program (I3P), the Agency Office of the Chief Information Officer (OCIO) has determined to take responsibility for enterprise-wide (Agency) delivery of IT services and sponsored a set of Agency-wide service delivery contracts to support this strategy. He noted that the NASA Enterprise Data Center (NEDC) is on hold at this time. The Agency is in the process of establishing governance structures and service offices for each major service area. For each service area, one or more Host Centers are identified as principally responsible for the service office. Ames Research Center (ARC), GSFC, and MSFC are identified as the Host Centers for the Agency CSO.
B. CSO has responsibility for enterprise-wide delivery of communication services. This includes all current services provided under the NISN Project, as well as additional local Center services except JPL. CSO staffing is primarily drawn from the three Host Centers – ARC, GSFC and MSFC. Areas of responsibility are aligned with the strengths of each center. The organization is coming to terms with the increased scope of responsibility without increased staff.
C. Mr. Douglas reviewed the Communications Service Office Structure diagram.
D. Mr. Douglas reviewed the CSO Mission Communications structure diagram. Mr. Douglas is Acting Operations Lead. The Security Lead is Mr. David Bloom with Mr. Chris Spinolo as alternate. Service Owners are now Service Element Managers (SEM). The Engineering and Integration area is a new area. Mr. Matt Kirichok is Lead.

MOVE is preparing to turndown and the Nortel Router Replacement Project (NRRP) is the other active project.

E. Mr. Douglas reviewed the CSO Mission Service Element Managers diagram.
F. Mr. Douglas reviewed the CSO Business Management diagram. He noted that Mr. Brad Butts and Ms. Heather Kobin are cross training for HSF.
G. Under the NASA Integrated Communications Services (NICS) contract, SAIC has mission communications with HTSI as the prime sub. This is the same team as under the Unified NASA Information Technology Services (UNITeS) contract.
H. Mr. Douglas reviewed the SAIC management approach. SAIC is working to balance a centralized approach with local management.
I. Mr. Douglas reviewed the GSFC Mission and Corporate Services diagram. The Mission Comm Managers are being integrated with the Mission CSR.
J. Mr. Douglas provided a Mission Outage Notification System (MONS) training overview. Many find MONS less useful due to message overload. The system has always had the ability to set up accounts and filters. CSO will train customers on how to set up MONS accounts and filters. The training is scheduled to start in July. This training will be of major benefit to our customers. The customer will be able to receive only those messages that are of benefit to them. As default, a customer may continue to receive all the messages. Training will be customized as needed.
K. Mr. Douglas discussed the RAD-2100 channel bank power supply replacement project. RAD is replacing power supplies that have been identified as having defective capacitors. Shipment of the power supplies to the sites has begun. There are a total of 126 to replace. To date, 36 have been replaced. When 13 have been replaced, every RAD in the network will have one good power supply.
L. Mr. Douglas discussed the Space Shuttle turndown of CSO services. Space Shuttle services have been dispositioned. All Space Shuttle funded services have been turned down. CORE requirements are on the backbone. CSO wants to turn those services funded by SCaN over to SCaN. Some services will be put in the category to reuse bandwidth for new customers or reduce capacity if possible. Mr. Douglas believes there is the capability to free up bandwidth for new customers without buying new services.
M. Mr. Douglas provided an NRRP status. Implementation is complete. The Transition Readiness review (TRR) was held on April 4. Nortel vendor maintenance has been extended using contingency funds. Transition completion is scheduled for January 2013.
N. Mr. Morse stated that he is reluctant to sign a Service Level Agreement (SLA) or Project Service Level Agreement (PSLA) on mission CORE funded services. CSO management may decide that SCaN has to pay the cost. Mr. Douglas stated that mission CORE is funded by SCaN. Mr. Morse stated that he needs to understand the path and get a break down of the funds.
O. Mr. Douglas stated that services that remain up and are not used post Shuttle have been identified as multi use or as channel assignments on the mission backbone. There is no rush to turn these services down unless CSO can also turn down circuits.
P. Mr. Morse stated that he understands that an owner is needed for the SLA.

Network Support Group Minutes

MOVE PROJECT UPDATE

Mr. Dan Duffy provided a MOVE project update (refer to the presentation, Mission Operations Voice *Enhancement*). A fire hazard in the Type-D keyset caused a recall of all the keysets for remediation. The retrofit is 70 percent complete and is expected to be complete by June. It is now a matter of the sites being able to free up their keysets for retrofitting. The 2.0.2 baseline release was successfully tested and distributed to all MOVE sites. The release includes adding Voice Activity Indicators (VAID) on idle lines, adding Type-B and Type-F keysets, and closing 37 systemic trouble tickets. Release 2.0.2.1 will fix the LSA issue. Release 2.0.3 is the next planned release and will address between 15 and 20 systemic trouble tickets. Testing is planned for the June timeframe. Final KSC delivery and acceptance marked the end of the 5-year base contract with Frequentis USA (FUSA). A 10-year vendor maintenance period follows. Mr. Duffy reviewed items that were presented to the CSO board as FUSA weaknesses and are not considered formal evaluation bullets. He noted that these bullets do not indicate that the vendor is not improving but need to be addressed as weaknesses. MOVE Project engineering support is currently unfunded after September 30, 2012. The engineering support helps to compensate for the cited weaknesses, bridges the technical gap between MOVE sites and FUSA, provides engineering and testing assistance to all MOVE sites, and provides in-depth knowledge of NASA missions and systems. Mr. Ken Jones stated that this is a serious concern for JSC and the other sites. All sites would then have to go direct to the vendor. There would no one managing the flow. JSC also has upgrades that they want to explore. Mr. Douglas stated that CSO has strongly asked that the issue of a central POC be addressed. Mr. Morse asked what the alternatives are for the future as NASA plans to build a launch head and build up the capabilities at Bermuda and the Ponce de Leon (PDL). Mr. Duffy stated that CSO can choose another vendor; NASA is not mandated to use MOVE.

EXPEDITION 31/32 OVERVIEW

Mr. Bill Foster provided an Expedition 31 and 32 overview (refer to the presentation, Expedition 31 and 32). The Increment Lead is Ground Controller (GC) Ms. Dot Wert and the Increment Backup is GC Mr. Brian Jones. Expedition 31 begins with the Soyuz TMA-22 undocking in April. Expedition 32 begins with the Soyuz TMA-03 undocking in July 2012. Mr. Foster reviewed the list of upcoming ISS events. He provided an Increments 31 and 32 timeline. Mr. Foster reviewed the Increment 31 and 32 crew biographies and provided a background on the Increment 31 and Increment 32 patches.

SLS / EM1 OVERVIEW

Mr. Bob Marriott provided an SLS and EM 1 overview (refer to the presentation, *Space Launch System [SLS] Exploration Mission #1 [EM1] Overview*).

A. Mr. Marriott noted that the information in the briefing is unofficial and subject to change without notice. Material is based on the SLS System Requirements Review (SRR). The purpose of the presentation is to share JSC knowledge of the SLS and EM1, identify items of interest to the NSG, and initiate a dialogue to define the MSRD and PRD.
B. Mr. Marriott reviewed the Exploration Systems Development (ESD) Program – Organizational Interfaces diagram.

C. Mr. Marriott reviewed the components of the SLS configuration. These components are important from a communications perspective. The SLS components are the Launch Abort System (LAS), Orion, Interim Cryrogenic Propulsion Stage (ICPS), 5-Segment Solid Rocket Booster, Core Stage Fuel Tanks, Core Stage Engine. RF interfaces include the MPCV links, ICPS link, Operational Point- to-Point (OP2P) link, and Developmental Flight Instrumentation (DFI) links.
D. EM1 will be an approximately 7-day unscrewed mission. EM2 will be a 10 -14 day crewed mission.
E. Communications elements are ground assets and SN.
F. The Orion spacecraft consists of the LAS, CM, Service Module (SM), and Spacecraft Adapter (SA). The LAS is not part of the Orion Project. This project will have 7 – 8 RF links vice the 1 or 2 that the network has been used to.
G. Mr. Marriott provided an EM1 Un-crewed Lunar Flyby Mission Profile.
H. Mr. Marriott reviewed the PRD development process. The Draft PRD (DPRD) is now the MSRD.
I. Mr. Marriott reviewed the proposed key Milestones. Mr. Bangerter stated that he will review the milestones with Ms. Melissa Blizzard. Mr. Marriott stated that in the previous projects, the network was involved late. There will be a Technical Interchange Meeting (TIM) in late May to start to develop requirements. Mr. Bangerter stated that his team is not yet engaged in this process.

NETWORK AND COMMUNICATIONS ANALYSIS AND INTEGRATION TEAM (NACAIT)

Mr. Mike Fanders gave a NACAIT status (refer to the presentation, *NACAIT Status*). There are no issues with the Canadian Space Agency (CSA) support. JAXA is providing full Japanese Experiment Module (JEM) support. HTV-3 launch is NET July 2012 and HTV-4 launch is NET June 2013. There are some latency problems that are being handled with SCD updates. The European Space Agency (ESA) is providing full Columbus Lab operations. ATV-3 is on orbit. ATV-4 will launch NET March 2013. The Agenzia Spaziale Italiana (ASI) is providing ongoing operations to the Permanent Multipurpose Module (PMM). The gateway is prime for Swift. Gateway modifications are being made for NuSTAR. It was noted that the gateway is all serial. The Russian Space Agency (RSA) voice switch replacement is in work. There are no changes to the SpaceX PRD. The MPCV MSRD has been baselined, but Rev A has been pulled back for rework. Mr. Hudiburg noted that the EM1 and 2 project progress has not been as swift as EFT-1. The contractor has authorization to focus on EFT-1. SLS has seen some maturity growth this year.

NSG ACTION ITEM WRAP UP

Two action items were assigned at the April 19, 2012, Main Forum of the NSG.

AI No.	Assignee	Action	Status
0412-NSG Main Forum-01	Tom Russell/ GSFC/ HSF	While updating the ATV Annex, update the document for both the ATV-3 and -4 missions.	**Open**
0412-NSG Main Forum-02	David Glasscock/ WSC	Provide Mr. Jim Bangerter with an assessment of the WSC 05/15 software delivery.	**Open**

CLOSING REMARKS

Mr. Bangerter thanked the attendees for their participation at the April 2012 NSG. He stated that there are exciting things coming such as EFT-1 and EM-1/2. Mr. Morse stated that there is also the Google Lunar Prize. The KSC launch head will happen, but funds are needed.
Mr. Bangerter stated that the next NSG is tentatively scheduled for the October 2012 time frame.

Network Support Group Acronyms and Abbreviations

ACU	Antenna Control Unit
AF	Air Force
AFSCN	Air Force Satellite Control Network
AI	Action Item
ARC	Ames Research Center
ASI	Agenzia Spaziale Italiana
ASRS	Automated Support Requirements System
ATV	Automated Transfer Vehicle
BCC	Backup Control Center
BM	Briefing Message
CCB	Configuration Control Board
CDS	Comprehensive Discrepancy System
CM	Crew Module
CMD	Command
CNOC	Corporate Network Operations Center
COTS	Commercial Orbital Transportation System
CSA	Canadian Space Agency
CSO	Communications Service Office
CSR	Customer Service Representative
DB	Database
DBCR	Database Change Request
DCN	Documentation Change Notice
DFRC	Dryden Flight Research Center
DFI	Developmental Flight Instrumentation
DICES	Digital Integrated Communications Electronic System
DLM	Depot Level Maintenance
DPRD	Draft PRD
DR	Discrepancy Report
DTF-21	Development Test Faciity-21 (JPL)
EC	Engineering Change
EFT	Exploration Flight Test
EM	Exploration Mission
ER	Eastern Range
ESA	European Space Agency
ESD	Exploration Systems Development
ESTL	Electronic Systems Test Laboratory
ETGT	Extended TDRS Ground Terminal
FDF	Flight Dynamics Facility

Network Support Group Acronyms and Abbreviations

FER	Freeze Exemption Request
FM	Frequency Modulation
FY	Fiscal Year
FUSA	Frequentis USA
GC	Ground Controller
GCC	Goddard Communications Center
GCMR	Ground Configuration Message Request
GDIS-R	Guam Data Interface System-Replacement
GP	Ground Processing
GRC	Glenn Research Center
GSDO	Ground System Development Office
GSFC	Goddard Space Flight Center
HEO	Human Exploration Operations
HOSC	Huntsville Operations Support Center
HPA	High Power Amplifier
HSF	Human Spaceflight
HTV	H-II Transfer Vehicle
I3P	IT Infrastructure Integration Program
ICPS	Interim Cryogenic Propulsion Stage
IN	Integrated Network
ISI	Interim Support Instruction
ISS	International Space Station
JAXA	Japan Aerospace Exploration Agency
JEM	Japanese Experiment Module
JPL	Jet Propulsion Laboratory
KSAR	K-band Single Access Return
JSC	Johnson Space Center
KSC	Kennedy Space Center
LAS	Launch Abort System
LDPC	Low Density Parity Check
LEOP	Launch and Early Orbit
LRO	Long Range Optics
LSSR	Launch Site Support Requirements
LTAS	Launch Trajectory Acquisition System
MILA	Merritt Island Launch Annex
MOD	Mission Operations Directorate

Network Support Group Acronyms and Abbreviations

MONS	Mission Outage Notifications
MOU	Memorandum of Agreement
MOVE	Mission Operations Voice Enhancement
MPCV	Multi Purpose Crew Vehicle
MSFC	Marshall Space Flight Center
MSRD	Mission Support Requirements Document
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
NEDC	NASA Enterprise Data Center
NEN	Near Earth Network
NICS	NASA Integrated Communications Services contract
NIMO	Networks Integration Management Office
NISN	NASA Integrated Services Network
NOD	Network Operations Directive
NOSP	Network Operations Support Plan
NRRP	Nortel Router Replacement Project
NSG	Network Support Group
NSR	NISN Service Request
OCIO	Office of the Chief Information Officer
ODAR	Obsolescence-Driven Avionics Redesign
OE	Operator Error
OP2P	Operational Point-to-Point
ORR	Operational Readiness Review
OSC	Orbital Sciences Corporation
PDL	Ponce de Leon
PMM	Permanent Multipurpose Module
POC	Point-of-contact
PRD	Program Requirements Document
PSLA	Project Service Level Agreement
RAIL	Rolling Action Item List
RSA	Russian Space Agency
SA	Single Access
SAA	Space Act Agreement
SCaN	Space Communications and Navigation

Network Support Group Acronyms and Abbreviations

SCD	Small Conversion Device
SCIO	Space Communications Integration Office
SCNS	Space Communications Network Services
SCP	Serial Conversion Processor
SEM	Service Element Managers
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
SME	Subject Matter Expert
SMM	Spaceflight Mission Managers
SN	Space Network
SNAS	SN Access System
SPOC	Space Programs Operations Contract
SRR	System Requirements Review
SRT	Station Readiness Test
SSAF	S-band Single Access Forward
SSAR	S-band Single Access Return
SSC	Sub-system Controller, Service Specification Codes
SSP	Space Shuttle Program
STGT	Second TDRSS Ground Terminal
SUPIDEN	Support Identifiers
SVT	System Validation Testing
TA	TDRSS Analyst
TBD	To Be Determined
TDRS	Tracking and Data Relay Satellite
TDRSS	Tracking and Data Relay Satellite System
TIM	Technical Interchange Meeting
TNOSP	TDRSS NOSP
TO&A	Test Operations and Analysis
TOCC	TDRS Operations Control Center
T&R	Transition and Retirement
TRR	Transition Readiness Review
TOSC	Test Operations Support Contract
TWTA	Traveling Wave Tube Amplifier
UAV	Unmanned Aerial Vehicle
UDS	Universal Documentation System
UHF	Ultra High Frequency
UNITeS	Unified NASA Information Technology Services contract

Network Support Group Acronyms and Abbreviations

USS CR	User Service Subsystem Component Replacement
VAID	Voice Activity Indicators
VHF	Very High Frequency
VoIP	Voice over IP
VV	Visiting Vehicle
WAN	Wide Area Network
WATR	Western Aeronautical Test Range
WG	Working Group
WGS	Wallops Ground Station
WSC	White Sands Complex
WSGT	White Sands Ground Terminal