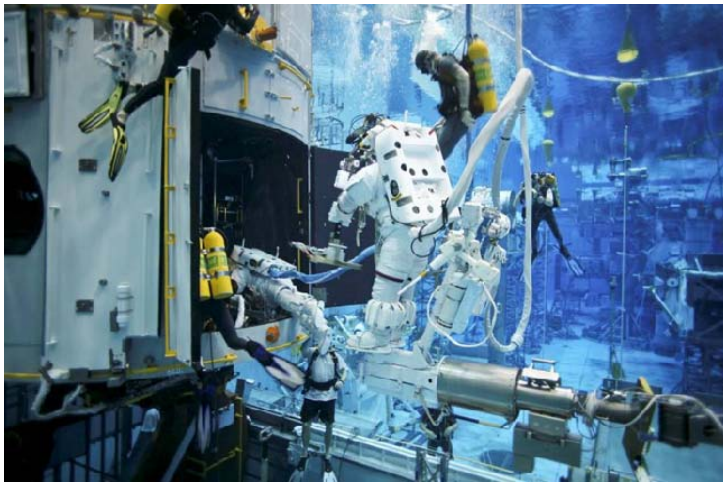
Human Spaceflight (HSF)
Network Support Group (NSG)
Meeting

May 7, 2009



Servicing Mission 4 astronauts practice on a Hubble model underwater at the Neutral Buoyancy Lab in Houston under the watchful eyes of NASA engineers and safety divers.

STS-125 Mission Patch

STS-127 Mission Patch

STS-128 Mission Patch

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

May 7, 2009

Johnson Space Center (JSC), TX
Regents Park III Building

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

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Network Support Group Attendance

The attendees listed below attended all or part of the May 4 – May 7, 2009 NSG (splinter sessions and/or main forum).

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Network Support Group Minutes

INTRODUCTION

Mr. Jim Bangerter convened the May 7, 2009, Human Spaceflight (HSF) Network Support Group (NSG) meeting to discuss requirements, planning, and issues in support of the Space Shuttle and International Space Station (ISS). Mr. Bangerter welcomed the attendees and thanked them for their attendance at the NSG.

Mr. Bangerter stated that at the last meeting the NSG recognized a Dryden Flight Research Center (DFRC) individual who had supported 100 Space Shuttle missions. After that he was informed of the names of others in the Integrated Network (IN) who have also supported 100 missions. He asked those in attendance at the NSG, who have supported 100 missions, to stand and be recognized. Mr. Bangerter thanked them for their support. Mr. Bangerter stated that the IN is depended on to provide critical communications support. He noted that the last mission was a very successful mission for the IN and that there has been a lot of preparation and training for the upcoming STS-125 mission. He asked that the IN team continue its great work. He thanked the HSF team and the sites, elements, Flight Dynamics Facility (FDF), and the National Aeronautics and Space Administration (NASA) Integrated Services Network (NISN) for their work in preparing for STS-125.

May 2009 NSG splinter session and main forum presentations and minutes can be accessed at the following URL: http://scp.gsfc.nasa.gov/hsfnsg/nsg/0408/nsg.htm

HSF ACTION ITEM REVIEW

Mr. Steve Testoff provided an Action Item (AI) review (refer to the presentation, *Human Spaceflight Action Item Status as of 05/04/09*). The HSF Rolling Action Item List (RAIL) is tracking action items from 13 meetings. Four Vandenberg Air Force Base (VAFB) transition meetings are not included as the meetings are on hold. Mr. Bangerter is preparing a presentation to give to the Space Shuttle Program (SSP) on the cost of continuing operations at VAFB. Once a decision is made by the SSP on whether to make the transition or not, the meetings will either continue or not continue. There are 13 meetings with open action items remaining. There are 30 open items; 25 over due items; and 11 meetings with overdue items. The RAIL is distributed weekly. Mr. Testoff is the Point-of-contact (POC) responsible for coordinating all HSF action items.

HSF DOCUMENTATION STATUS

Ms. Trish Perrotto provided an HSF documentation status (refer to the presentation, *Human Spaceflight Documentation Status/Plan*). Ms. Perrotto stated that she is giving this presentation for Mr. Earl Daniel. There are a variety of documents being reviewed and modified at this time. Four documents have been published since the last NSG. This includes the *Network Operations Support Plan for the Space Shuttle Program*, 450-NOSP-Space Shuttle, Revision 1, Documentation Change Notice (DCN) 002 and the *Network Operations Procedure for Air-to-Ground Voice Systems*, 450-NOP-001 rewrite. Documents in Configuration Control Board (CCB) review include the *Shuttle Antenna Monitoring System (SAMS) User's Guide*, 451-UG-HSF/SAMS, DCN 001. Five documents are in general review including the *Network Operations*

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Directive for Human Space Flight Network Support, 450-NOD-HS, Revision 3 and the *Tracking and Data Relay Satellite System Network Operations Support Plan for the International Space Station (ISS)*, 450-TNOSP-ISS rewrite (supersedes the 450-602/ISS). Three documents are in local (internal) review including the *TDRSS NOSP for the ISS, H-II Transfer Vehicle (HTV) Annex*, 450-TNOSP-ISS HTV Annex (supersedes Appendix C to 450-602/ISS). Ms. Perrotto reviewed the plan for the upcoming Fiscal Year (FY). She stated that the presentation includes a table that lists the documents identified for updating during the next FY based on priority, funding, and available resources. The table lists the technical experts and document managers. Ms. Perrotto asked those who receive documents to provide comments in a timely manner. Mr. Bangerter asked recipients to please respond. Mr. Joe Aquino stated that the Network Operations Integration Team (NOIT) office will be assigned as the focal point for document review. Mr. Bob Marriott is the focal point for coordinating Johnson Space Center (JSC) input. Mr. Joe Aquino accepted an action item to Email Mr. Jim Bangerter/Goddard Space Flight Center (GSFC)/ HSF Network Director (ND) to formally inform him that NOIT shall be the focal point for documents in review at JSC (action item 0509-NSG-01).

SPLINTER MEETING SUMMARIES

The following splinter meeting summaries were provided by the chairpersons or designee:

A. Obsolescence Driven Avionics Redesign (ODAR) Status. Dr. Norman Kluksdahl provided an ODAR status splinter meeting summary (refer to the presentation, *Implementation of Obsolescence Driven Avionics Design [ODAR] CR 10995*). The intent is to implement a 300-Mbps return link and a 25-Mbps forward link. Changes will be made to the communications network. The ISS Downlink Enhancement Architecture (IDEA) network will be turned down. An OC12 network will be implemented between the centers. A 300-Mbps Premium Internet Protocol (PIP) service will be implemented between JSC and the Marshall Space Flight Center (MSFC) for testing. This project is much like the IDEA and Front End Processor Replacement (FEPR) projects. The project is funded by the ISS Program (ISSP). The ground system Preliminary Design Review (PDR) has been completed. The forward link will be baselined to 7 Mbps because it is the existing capability at the White Sands Complex (WSC). The program is waiting on a cost from the Space Network (SN) to get to 25 Mbps. The program will proceed to implement the 25-Mbps forward link once the cost is known and a placeholder is in the budget for the link. There was an issue at WSC in regards to the 7-Mbps forward capability. It was determined to be a scheduling issue for Scheduling Orders (SHO). A 6.9999 SHO can be put in with clock of 7 Mbps. There is an issue related to the decommissioning of the IDEA network. Once done, there is concern with testing and the operations network; this will constrain testing. A comprehensive test plan is needed. A service is being installed for the Backup Control Center (BCC). The overall project is proceeding well and there are no major issues. Dr. Kluksdahl stated that he will continue to provide status. Mr. Scott Greatorex asked the target deadline. Dr. Kluksdahl stated that the deadline to be off IDEA is next June. ODAR testing is to begin in December 2010. Transition is scheduled for 2011 on board.

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B. TV Working Group (WG). Mr. Fred Pifer provided a TV WG splinter meeting summary (refer to the presentation, *Network Support Group Integrated Networks TV Working Group*). The WG was formed to address TV support issues. Problems occurred on STS-124 and STS-126. There was an In Flight Anomaly (IFA) related to access codes issues. The operations procedures were updated and an Interim Support Instruction (ISI) written that was used on STS-119. STS-119 support went well and the ISI will be reviewed and cleaned up. A DCN is being prepared for the Network Operations Support Plan (NOSP) and the Tracking and Data Relay Satellite System (TDRSS) NOSP (TNOSP). Viewing restrictions on general private medical conferences have been put in place. There was a request from JSC to remove the TV handover procedures from the Network Operations Procedures (NOP) for TV. The handover procedure is not nominal, but would be needed in the case of K-band loss. Mr. Aquino stated that Mr. Earl Baum has spoken with Houston TV and this request is withdrawn. Mr. Pifer stated that the procedure will be reviewed and updated as necessary. DFRC is adding a low-pass filter to the Aeronautical Tracking Facility (AFT)-3. The NOP will be updated accordingly. A discussion was held on troubleshooting procedures. The JSC Ground Controller (GC) is the focal point. The GC and GSFC Spaceflight Mission Manger (SMM) need to be notified. An ISI will be prepared. A Dual Tone Modulated Frequency (DTMF) video encoder has been installed to provide remote transponder switching. This worked well on STS-119. Mr. Pifer reviewed network test and training. Several action items were assigned. Mr. Pifer will be reviewing and updating ISI NR. 020.

C. DFRC Network Command Processing System (NCPS) and 1/3 Rate Decoder Replacement Splinter/PDR. Mr. Robert Jones provided a DFRC NCPS one third-rate encoder splinter meeting summary (refer to the presentation, *DFRC NCPS and 1/3 Rate Decoder Replacement Splinter/PDR Summary*). The splinter was called a PDR, but was closer to a Critical Design Review (CDR). The purpose was to review the objectives; current concerns; requirements, the Statement of Work (SOW), and design; and review the integration and test schedule. The two NCPSs will be replaced with two Linux based Scalable Integrated Multi-mission Support System (LSIMSS) Command and Telemetry Processors (CTP). Both Dryden Apple Replacement System (DARS)/Programmable Telemetry Processors (PTP) will be upgraded. Once the upgrade is complete, DRFC will no longer support Site Status Messages (SSM). Three requests for Action (RFA) were assigned.

D. STS-125/400, STS-127, and STS-128 Mission Planning. Mr. Fred Pifer provided the Space Shuttle mission planning splinter meeting summary (refer to the presentation, *STS-125-400/127/128 Mission Planning Meeting Summary*). Mr. Pifer stated that the first part of the splinter meeting was the STS-125/499 Pre Mission Telecon (PMT). All elements reported that they are ready to support and there are no issues. The purpose of the mission planning splinter was to review top-level requirements and provide an overview of the IN status and testing for the next 4 Space Shuttle missions. Mr. Pifer reviewed the TDRSS fleet configuration for STS-125/HST. Mr. Pifer reviewed the STS-125/HST mission overview. Discussion highlights included:

1. Support for STS-127 and -128 will be similar to previous missions.

2. Testing between STS-127 and-128 will be minimized due to the short time period between the two missions.
3. Testing will be driven by network changes or anomalies.
4. The White Sands Ground Terminal (WSGT), Second TDRSS Ground Terminal (STGT), and Guam will perform Mission Readiness Tests (MRT) for all missions.
5. Overlapping SHOs will be scheduled to provide coverage for both Orbiters (STS-125 and STS-400).
6. Virtual Spacecraft support will not be used for STS-125/400 and the Hubble Space Telescope (HST), but is available for STS-127 and -128.
7. Wallops will not remote real-time video for STS-125/400.

E. SpaceX. Mr. Dennis Mateik provided a Commercial Orbital Transportation Services (COTS) (SpaceX) splinter meeting summary (refer to the presentation, *COTS [SpaceX]*). The purpose was to provide an overview of Space X support requirements. Mr. Mateik presented status of NASA implementation to meet support requirements. The document status was presented. The NISN requirements are complete. Most of the SN requirements are complete as well. The FDF is still working on the precision of the products. Mr. Greatorex stated that the FDF is using the former Detailed Mission Requirements (DMR) document and asked if the requirements can be documented in the Network Program Requirements Document (NPRD). Mr. Aquino stated that the FDF requirements are in the NPRD. The product formats are not in the PRD.

F. WSC Upgrades (SN Ground Segment Sustainment [SGSS] Customer Outreach). Ms. Ame Fox provided a WSC Upgrades splinter meeting summary (refer to the presentation, *SGSS Customer Outreach Integrated Networks Summary*). Ms. Fox reviewed the SGSS in the SN diagram which illustrates the SGSS portion of the SN ground segment. SGSS is updating a large portion, but not all, of the SN Ground System (SNGS). The upgrade is scheduled to occur in the 2014 timeframe. Ms. Fox stated that the User Services Access (USA)/ User Services Subsystem Replacement (USSR) SNGS near-term solution activities are ongoing as well. During the splinter meeting Ms. Fox provided a background of the SGSS program, described where the SGSS fit in to the SN, discussed programs that provide updates to the SN and SNGS between now and the installation of SGSS (2014), reviewed a functional decomposition of SGSS, reviewed requirements drivers, and reviewed transition constraints. Ms. Fox stated that the SN will hold frequent customer meetings. This was the first customer outreach meeting. The program is the DRAFT Request fro Proposal (RFP) phase.

G. Kennedy Forward Return Link (KFRL). Mr. John Steffes provided the KFRL splinter meeting summary. During the meeting the status of the KFRL was reviewed and a look taken at what the future of the command verify capability might be. Any implementation would not interfere with JSC operations. Additional testing and additional Small Conversion Device (SCD) testing is required. An Emergency Mission Control Center (EMCC) demonstration was conducted and incorporated into the future concept. Some action items were assigned. The capability still needs to be presented to the various approval boards. Mr. Jim Bangerter stated that the return link will not be considered.

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H. Onizuka Air Station (OAS) – VAFB Transition. Mr. Jim Bangerter provided an OAS – VAFB splinter meeting summary. Mr. Bangerter stated that this was not held as a formal splinter meeting as originally scheduled. The VAFB transition WG meetings have been suspended until the number of customers is determined. A presentation package has been prepared to take to the customers for buy-in. The cost needs to be known and presented to the customers. There is no Air Force cost. The cost is all NISN costs (services and SCDs). The presentation will be provided to the customers by the end of July. The costs will be determined and if customers agree, NISN will be told to proceed. If the customers agree, the WGs will resume. The last Space Shuttle flight is scheduled for during the OAS dual operations period. If Space Shuttle is flying, will the Air Force continue to support the last mission while it is underway?

I. E&M Keying. Ms. Monique McLamb provided the E&M keying splinter meeting summary. There are three channels to DFRC for landing and the channels are now tone keyed. There is a lot of noise and several options are being explored to eliminate the tone keying. The best option is for GSFC to configure for the E&M keying. GSFC has agreed to do this. An action item was assigned to Ms. Culley to do a NISN Service Request (NSR). It may be possible to implement this after STS-128. It will be a 60 – 90 day process. Ms. McLamb noted that the Transoceanic Abort Landing (TAL) sites remain tone keying as well.

J. HSFC WG. Ms. Angela Culley provided the HSFC WG splinter meeting summary (refer to the presentation, *Human Spaceflight Comm Working Group*). The purpose of the meeting was to review current/future NISN requirements supporting HSF. The HSC WG is a weekly meeting where current and future requirements are reviewed. Highlights included the discussion of a proposed solution for the Kennedy Space Center (KSC) RS-422 sync interfaces and an ARES 1-X requirements review. Two action items were assigned (open an NSR to implement transition of KSC synchronous services and respond to ARES 1-X DBRs).

K. Mission Operations Voice Enhancement (MOVE) – GSFC Contingency. Ms. Michele Mascari provided the MOVE – GSFC contingency planning splinter meeting summary (refer to the presentation, *MOVE – GSFC Contingency Planning*). The purpose of the meeting was to begin discussion of external dependencies to implement MOVE-GSFC contingency modes. Three operations scenarios were discussed. As planned today, no voice conferences are shared between MOVE-GSFC-1 and MOVE-GSFC. Users must log onto their keysets; however, there is no time limit for how long they may remain logged in. Ms. Mascari and Mr. Randy Honeycutt will work with the NASA GSFC Customer Interface Group (CIG) to identify the voice services that are real-time critical to be considered as candidates to be supplied independently to GSFC Building 32 Mission network demarcation.

L. Alternate State Vector Management (ASVM) WG (formerly Station Development Test Objective [SDTO]). Mr. Mark Severance provided an ASVM (formerly SDTO) splinter meeting summary (refer to the presentation, *Alternate State Vector Management Working Group [ASVM WG] Splinter Summary*). This was a follow on from a November 2008 meeting to address onboard GPS based Mission Control Center (MCC)-H ground

processed ISS state vectors for SN use rather than TDRSS OD derived vectors provided by GSFC FDF. Two areas of focus were discussed: demonstration of backup capability (fax transmission from MCC-H to WSC) and assessment of the GPS capability. The concept was reviewed by all the involved parties. It was decided not to pursue the backup capability as an SDTO. An ASVM WG membership was defined. A charter will be developed. It was decided that the backup capability should be tested no later than October 1. Is the use of fax transmission the ideal methodology? In parallel, the WG will examine the pros/cons, risks, cost, and schedule associated with development and implementation of the GPS-based capability. Six action items were assigned; one of which is establishing POCs for the WG. Mr. Bangerter stated that Mr. Gonzales will be the WSC POC. Mr. Morse stated that a Space Communications and Navigation (SCaN) POC is needed because the GPS methodology would be non-standard utilization of SCaN assets. The standard utilization of TDRSS is vectors from FDF. He stated that he can represent SCaN with Mr. Pete Vrotsos' approval. Mr. Morse stated that this discussion should open new discussion of the institutionalization of FDF resources with FDF being a customer cost. Scientific customer costs will be impacted if the proposal is accepted.

M. H-II Transfer Vehicle (HTV) Status. Mr. Bob Culbertson provided an HTV status splinter meeting summary (refer to the presentation, *HTV Pre-Mission Network Status*). Mr. Culbertson displayed the agenda from the splinter group. The session was held to discuss network support for the HTV mission; SN capability and testing were discussed. There were no controversial items. Huntsville Operations Support Center (HOSC)-BCC testing is scheduled for May 23. HTV/TDRSS/Ground Segment (GS) End-to-end (ETE) testing is scheduled for May 23 – 26. No action items were assigned.

N. Very High Frequency (VHF) Support Status. Mr. Kevin Riley provided a VHF support status splinter meeting summary (refer to the presentation, *ISS/Soyuz VHF Support Team Network Support Group VHF Ground Station Status*). Mr. Riley reviewed the splinter group agenda. Mr. Riley reviewed the VHF ground station network configuration. He asked the attendees to note the antenna summary in the upper right hand corner of the diagram. The present station configuration supports ISS and Soyuz per the PRD. VHF-2 is not licensed to transmit (only in an emergency). Mr. Riley provided a hardware status. Except for the elevation antenna positioner and the TE Power Amp located at WSC the spare equipment and parts are sufficient to maintain the VHF systems for several years if upon the failure of any of the component a new component is procured. Mr. Mike Yettaw stated that DFRC has TEs. Mr. Riley reviewed the proposed network upgrades. The major upgrade would be to provide the capability to record straight from the VHF computers. Mr. Riley discussed proposed VHF-2 testing. Testing is more critical due to dual Soyuz coverage. Efforts are underway to gain approval for VHF-2 testing on routine basis. During the splinter group, dual Soyuz support scenarios were reviewed. One scenario discussed was an emergency situation with two undocked Soyuz. Mr. Riley stated that documentation is being reviewed/updated. Six action items were assigned. One action item pertains to C-band tracking requirements for Soyuz evacuation scenarios. Mr. Bangerter stated that the network needs to know the requirements; there is discussion that the program may not require C-band support.

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SN STATUS

Mr. Bob Gonzales provided an SN status (refer to the presentations, *TDRS Constellation Status, WSC Software & Hardware Activities and TDRS Designators*).

A. Mr. Gonzales reviewed the TDRS fleet status (TDRS configuration), which was current as of May 5.

B. Mr. Gonzales reviewed the TDRS fleet status.
   1. The TDRS-3 S-band Single Access (SSA)-1 forward helix current continues to be monitored. There are procedures on console to configure to a redundant Traveling Wave Tube Amplifier (TWTA) if required.
   2. TDRS-3 Space-to-Ground Link (SGL) dedicated downlink TWTA #2 helix current is rising. There are no unused SGL TWTAs on TDRS-3.
   3. TDRS-4 K-band Single Access (KSA)-2 forward power is below specification. Little or no adjustment of the output power is available on the TWTA. There has been no user impact. Mr. Gonzales responded that it would take approximately 4 hours.
   4. Space-to-Ground Link Terminal (SGLT)-4/TDRS-4 has been experiencing irregular, apparently random telemetry errors (hits). There was very minor data loss. A spare TWTA is available and corrective will be performed at Code 452 direction.

C. Mr. Gonzales reviewed the TDRS-3/TDRS-7 swap out. The drift will begin in June. When complete, TD3 will go into storage. Mr. Andy Lalich asked when the service swap is planned. Mr. Gonzales replied that it is scheduled for July 23.

D. Mr. Gonzales reviewed the hardware activities.
   1. The Tracking, Telemetry, and Command (TTC) Automated Data Processing Equipment (ADPE) Alpha transition will replace obsolete VAX equipment. Schedule adjustments will be made as necessary.
   2. A High Rate Data Switch (HRDS) replacement is underway. There are obsolescence problems with the old switch. STGT has made a partial transition and is having no problems. STGT is operating in the hybrid mode at this time.
   3. Guam Data Interface System (GDIS) replacement is underway. The GDIS is obsolete. The replacement will be accomplished in three phases. Phase 1 was completed last year. Phase 2 is underway. Phase 3 is currently on hold.
   4. The TDRSS Operations Control Center (TOCC) console/position layout is being changed. Controller positions will be relocated to the STGT.
   5. The Integrated Receiver Sustainment (IRS) project is working to develop a modem to replace existing Multiple Access (MA) receivers. This has no impact to the Automated Transfer Vehicle (ATV) or HTV.
   6. SGLT leveling is ongoing. This will provide SMA forward and return services on SGLT-3.
   7. The Guam Upgrade to the Timing System (GUTS) effort will install timing upgrades to improve the accuracy of the timing system.

E. Mr. Gonzales reviewed the software activities schedule. SW 09001 and NCC 0901 changes will allow scheduling of the 64 additional ports delivered with the HRDS-R.

SW 08012 is a general maintenance delivery which fixes 60 Discrepancy Reports (DR). SW 08013 is a general maintenance delivery which fixes 10 DRs.

F. Mr. Gonzales discussed TDRS designators.
   1. The current naming convention has caused confusion among users when scheduling or speaking to TDRS locations. Two TDRS locations do not match their names. Users have requested a change to the current naming convention. The NCC Data System (NCCDS) is limited to a 3 alpha/numeric character designation. Changing NCCDS to greater than that require major software changes. NCCDS can support a change within the 3 character alpha/numeric limit at any time. Any change would require changes to the documentation and customer scheduling systems. A Network Advisory Message (NAM) would precede any change. Some users would require a longer lead time to impellent the change to hard coding in theirs systems.
   2. Mr. Aquino stated that hard coded TDE, TDW, and TDS users have gone to other systems. Mr. Gonzales stated that he is now aware of which users have or have not changed.
   3. Mr. Aquino stated that the hard-coded users do not use 171 and it is, therefore, not an issue. This is a crew, on board issue.
   4. Mr. Gonzales stated that WSC understand the issues imposed on the customers.
   5. Mr. Bob Marriott stated that if there are contingency procedures in the case of communications loss and the procedure would now have 171 selected and the wrong satellite would be pointed to. Mr. Bangerter stated he has sent this information to the SN project and why this has not been addressed is an SN project issue. Mr. Jim Bangerter accepted an action item to contact SN Project management and inform them of user impact of maintaining the current TDRS naming convention (action item 0509-NSG-02).
   6. Mr. Mike Marsh stated that this is all user communications issues (on board, INCO's, etc). This has caused great confusion. The satellites are in positions named for other satellites. A selection mistake could affect the crew schedule. Mr. Bangerter stated that the crew needs to be briefed. Mr. Bob Culbertson accepted an action item to determine if the crew has been briefed on the TDRS naming convention and the impact to selecting the proper satellites (action item 0509-NSG-03).
   7. Mr. Bangerter stated that if this is a safety issue, it needs to be addresses as a safety issue and not just naming convention issue. Mr. Gonzales stated that WSC can do a change within now. Mr. Aquino stated that JSC would like an explanation from the SN project as to why nothing has been done. Mr. Bangerter asked for an explanation of communications outages and current mitigations and how this is a safety issue. Mr. Bob Culbertson accepted an action item to provide input via email to Mr. Jim Bangerter/GSFC/NASA/HSF ND outlining the safety implications of continuing the TDRS naming convention (action item 0509-NSG-04). (Editor's Note: Mr. Culbertson provided an input on May 26, 2009. This action item is **CLOSED**.)
   8. Mr. Gonzales reviewed the several options suggested for TDRS naming. WSC does not like the TDE, TDW, TDS convention, but prefers the positional designation. There would be problem with this convenient if TDRSs were co-located.

9. NASA Code 452 is doing a study and will provide recommendations.

ISS ACTIVITIES

Mr. Mitch Venable provided an ISS activities overview (refer to the presentation, *Expedition 19/20*). Mr. Venable displayed photos of the Expedition 19 and 19/20 crews. Expedition 19 began on March 26. A major milestone for ISS will be the arrival of additional crew to bring ISS to a crew of 6. Once all six are on board, Expedition 20 begins. This will be the first time all five International Partners are represented on board. Extra Vehicular Activities (EVA) are scheduled for June to prepare the ISS for the addition of the new Russian module. Expedition 20 will host the arrival of a Russian Progress resupply vehicle, two Space Shuttles, and the fist HTV cargo vehicle. During this period, there will be MPC and SNAS upgrades. No impacts to operations are anticipated. The annual BCC checkout is scheduled for June 1. Procedures are being updated. SRs are in place to add IP command/telemetry connectivity to the BCC/HOSC. This will allow for early power down of MCC-H equipment without impact to Japanese Experiment Module (JEM), COL, and RS operations. If implementation does not occur, MCC-H equipment will be left powered on for as long as CODs hurricane ride-out team is able to remain at JSC. Mr. Venable reviewed the Visiting Vehicle (VV) elements. Mr. Venable reviewed major ISS activities for Expedition 20. He also reviewed the crew rotation overview and timeline. An expedition is the crew of one Soyuz (plus Space Shuttle rotating crew). An Increment is the tenure for a single Commander. An Increment starts with the departure of a previous Commander. A new Commander is 'promoted' from the onboard crew. The old Soyuz departs 2 – 3 weeks before the arrival of the new Soyuz.

MILA/PDL STATUS

Mr. Ray Boatwright provided a Merritt Island Launch Annex (MILA)/Ponce deLeon (PDL) status (refer to the presentation, *MILA/PDL Status*). The MILA NCPS-1 experienced a problem approximately one week prior to the NSG. The NCPS locked up when in operate and carrier down. The problem was isolated to a hard drive. The hard drive was removed and replaced. The problem cleared and NCPS-1 was used as prime during the Portable Spacecraft Simulator (PSS) checkout. Mr. Boatwright stated that MILA is confident that MILA can be configured nominally for STS-125. Mr. Bangerter stated that concurred as long as there are not problems during testing. The 9M-1 antenna semi-annual and annual maintenance has been completed. The 9M-2 semi-annual and annual Preventive Maintenance (PMs) are due and will be completed post STS-127. Mr. Boatwright reviewed post STS-127 planned changes. The Radio Frequency (RF) switch Sub-system-Controller (SSC) computers will be replaced. The communications switch SSCs will be replaced. The obsolete MILA Bermuda Re-Engineering (MBR) routers will be replaced. The PDL generator status screens software will be updated. Staffing is sufficient to meet requirements.

WALLOPS STATUS

Mr. Mark Harris provided a Wallops status (refer to the presentation, *Wallops 11M Status*). Mr. Harris reviewed post STS-124 changes. The Antenna Control Unit (ACU) was upgraded. The slaving computer hardware was upgraded. External Tank (ET) TV control computer had

been replaced. The unit lost power last week and the power supply was replaced and new one ordered. The box will be returned to GSFC. VHF-1/2 computers were moved to the Open Internet Protocol Operations Network (IONet). Both 11M azimuth gearboxes were rebuilt due to excessive wear. The elevation brake assembly was lost and is being fixed. Mr. Harris reviewed post STS-124 software changes including Dewitt version 6.4.0 installation, slaving system software upgrades, an ACU antenna software patch, and Enertec firmware version 10.2.9.2 installation. Mr. Harris reviewed the station configuration for STS-125 and STS-127. Mr. Harris reviewed the VHF-1/2 equipment status. There are no current issues. Previously, the VHF-1 computer fan failed. The backup computer fan failed as well. Mr. Kevin Riley stated that he was not aware that any other stations have had this problem. There are no open Discrepancy Reports (DR). Staffing is sufficient to meet requirements. Future testing includes PSS testing validate the PTP commanding upgrade and GSFC/JSC data flows post upgrade (if possible). Mr. Bangerter stated he needs some documentation on the NCPS one-third rate decoder replacement effort. Mr. Mark Harris accepted an action item to provide a WFF NCPS replacement update to Mr. Jim Bangerter/GSFC/NASA/HSF ND (action item 0509-NSG-05). Mr. Harris reviewed the open work.

DFRC STATUS

Mr. Mike Yettaw presented a DFRC status (refer to the presentation, *DFRC Range Status*). ATF-1 is prime. ATF-2 is backup. ATF-3 is backup landing contingency only if one ATF site goes down. NTR is configured for terrestrial/satellite circuit diversity. Transponder 5 video support is configured 24x7 during mission support. Mr. Yettaw reviewed the in-work items. NCPS, DARS-PTP 1/3 rate TDRSS upgrade is in work. Checkout is tentatively scheduled by STS-128. Landing support is being consolidated in one site. The comm 3 reflector is being replaced due to mesh degradation. It could be replaced with a solid dish if funding was available. There are two other dishes to support.

AFSCN/SDTW STATUS

Lt. Victoria Gomez provided an Air Force Satellite Control Network (AFSCN)/Space Development Test Wing (SDTW) status (refer to the presentation, *NSG AFSCN Update*). Kirtland Air Force Base (KAFB) provides NASA, booster, and R&D satellite support. Lt. Gomez reviewed the organization chart. Four persons make up the SDTW team. Lt. Gomez reviewed the Space Shuttle support requirements. There are no mandatory sites. Lt. Gomez provided a Space Shuttle support overview and reviewed the communications links. The LION-A outage is an open issue. The ACU was not communicating with the Automated Remote Tracking Station (ARTS) core for channel 21 (Space Shuttle channel). The ACU has been replaced. The Space Shuttle Inter-Range Operations Number (IRON) was loaded with problem. Procedures for manual change are in place. LION-B is scheduled with LION-A shadowing. LION and BOSS will not be used for STS-125. The Mission Impact Report (MIR) remains open.

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CONSTELLATION STATUS

Mr. George Bull provided a Constellation status (refer to the presentation, *Constellation*). Constellation is one of five programs under the Exploration Missions Directorate. The Directorate will develop the lunar transportation system capability and then transfer maintenance and production. Then the Directorate will begin developing the lunar sorties and outpost capabilities. In January 2004, Congress authorized A Bold Vision for Space Exploration. The plan called for the completion of the ISS and safely flying Space Shuttle through 2010. The plan still calls for 2010, although fiscal plans may impact that date. A crew Exploration vehicle (Orion) would be developed by 2014. The current budget has Orion ready by 2015. Return to the moon would be 2020, but currently it looks like 2021. The Vision calls for the implementation of a sustained and affordable human and robotic program. Today, 80 percent of the budget is Space Shuttle (however, Space Shuttle has been in operation for 30 years and that is a fixed cost). The MOD vision is operations at 50 percent of the Space Shuttle cost. The Vision calls for International and commercial participation. This has not been implanted for Ares, but will be looked at for the lunar program. Mr. Bull reviewed the typical lunar reference mission. The Mars and Beyond component will be after we get to the moon. Mr. Bull reviewed the Constellation Program organization chart. The new agency governance model implements specific control gates with reviews. If there are agency or center standards, only the agency or center can waive the requirements. The Mission Operations Project is part of MOD. There are three technical authorities in the Mission Operations Project. Two reporting mechanisms are in place. Technical reporting goes up to the appropriate AA. Constellation leverages unique skills and capabilities throughout NASA. All centers have Constellation work. The program has completed SDRs.

ISS FEPR

Dr. Norman Kluksdahl provided a Front End Processor (FEP) Replacement (FEPR) update (refer to the presentation, *FEPR Status Update*). FEPR replaces the obsolete Front End Processors (FEP). The FEPR project has been implemented in two major phases. FEPR replaces the 800x900 serial matrix switch, Multiplexer/Demultiplexer (MDM), and other equipment when Space Shuttle retires. Level-0 S-band data processing is moved to WSC. No more serial data interfaces fro command and telemetry. Phase 1 (command and telemetry) went operational in June 2008. Phase 2 moved the other Nascom 4800-bit block interfaces to the Transmission Control Protocol/Internet Protocol (TCP/IP) network. Dr. Kluksdahl reviewed the new network architecture. Dr. Kluksdahl provided a current status. Auxiliary Network Control Center (ANCC) testing has been completed. An NCCDS Ops Integration Test was conducted, but was not completely successful due to a scheduling error. A second test is scheduled for May. OST step-up will occur over the next couple of months depending on mission activities.

MOVE STATUS

Mr. Dan Duffy provided a MOVE status (refer to the presentation, *Mission Operations Voice Enhancement MOVE Project Update*). Mr. Duffy stated the MOVE news has been good lately and the schedule is advancing. He reviewed MOVE major milestones completed including First Article (FA) testing; GSFC, MSFC, and JSC Factory Acceptance Testing (FAT); delivery of the

GSFC system; GSFC Site Acceptance Testing (SAT); delivery of the MSFC system; and MSFC SAT. FA testing measures the system against requirements. FAT is a subset of FA testing. The site configuration is set up at the vendor. FA and FAT went well. Mr. Duffy reviewed the Key Event Schedule. The schedule includes delivery, training, and testing dates. All are subject to work freezes. WSC sites contract awards are in progress. Wallops contract award is in July 2009. KSC contract award is in February 2010. A KSC commitment is still needed. Respective MOVE site leads should be contacted for site-specific information. MILA and DFRC are on contract, but have not exercised options yet.

NACAIT

Mr. Robbie Frazier provided a Network and Communications Analysis and Integration Team (NACAIT) status (refer to the presentation, *NACAIT Status*). Mr. Frazier stated that all the International Partners have their own gateway with control centers that they maintain. The Canadian Space Agency (CSA) has no issues. The Japan Aerospace Exploration Agency (JAXA) has no issues. The European Space Agency (ESA) COL has done a full upgrade from Asynchronous Transfer Mode (ATM) to Multiprotocol Label Switching (MPLS). ESA ATV is redesigning its network and operations center. An alternate TDRSS ground segment is being added. The Agenzia Spaziale Italiana (ASI) is the prime command/telemetry path for SWIFT. The Russian Space Agency (RSA) is undergoing a major network upgrade.

ISS BCC RELOCATION TO THE HOSC

Mr. Dave Theriault provided a status of the ISS BCC relocation (refer to the presentation, *BCC-HOSC*). BCC is the backup facility for the MCC (ISS) if there is an emergency. Operations are from a BCC facility, which was originally in Moscow, but proved to be problematic. The BCC team goes to Round Rock, TX and operates from laptops. From there the team accesses MCC damage and returns or goes to the HOSC. Mr. Theriault reviewed a BCC-HOSC configuration diagram. Conjunction data boxes were in the original plan, but that did not work and an alternate method is being investigated. Mr. Theriault reviewed lessons learned from the last BCC activation: hotel hubs are not reliable enough for Mission Critical Operations data and voice services, the Integrated Planning Systems (IPS) database swing took too long, RSA services are required in the BCC to support docking, and the Flight Directors (FD) and Flight Control Team (FCT) has difficulty moving files into and out of the BCC IPS environment. Mr. Theriault reviewed what will be new for the 2009 hurricane season. There will be increased bandwidth (MSFC – JSC). NISN has implemented a 300-Mbps service for ODAR testing that the BCC will share; ODAR has priority. This will help reduce the time to swing the IPS database. A new hotel has been selected that has high quality internet services. The team also has new laptops. RSA, ESA, and JAXA will have access to the BCC-HOSC. BCC will meet all requirements available from the MCC-H within BCC capability (e.g., no redundancy). No BCC capability is being added. The MCC will not have to be operational when BCC is operational. File transfers will no longer require System Admin. Items that are outstanding are the Conjunction Data Service (CDS), SNAS deployment, and Orbiter Communications Adapter (OCA) upgrades. Mr. Theriault reviewed the schedule.

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SHUTTLE MISSION OVERVIEWS

Mr. Bob Marriott provided a Space Shuttle mission overview (refer to the presentation, *Shuttle Mission Overviews STS-125/400/127/128/129*). STS-125 is the HST Servicing Mission (SM), scheduled for May 11. This is a 28.4 degree inclination launch. The inclination changes the ascent profiles and TDRSS scheduling. STS-400 is the rescue flight. If needed, the launch date would be May 19. The STs-125 FCT would be moved to an alternate room and the STS-400 FCT would be brought into the prime control center. STS-127 is the 29th ISS flight scheduled for June 13. STS-127 will deliver the JEM Exposed Facility and Kibo Japanese Experiment Logistics Module – Exposed Section (ELM-ES). STS-128 is scheduled for August 6 and the primary payload is the Multi-purpose Logistics Module (MPLM). This mission will include three EVAs. STS-129 is scheduled for November 2009. A second S-band antenna system will be delivered.

NSG ACTION ITEM REVIEW

The following action items were assigned at the May 7, 2009, NSG:

0509-NSG-01	Joe Aquino/JSC/NASA/SCIO
ACTION:	Email Mr. Jim Bangerter/GSFC/HSF ND to formally inform him that NOIT shall be the focal point for documents in review at JSC.
0509-NSG-02	Jim Bangerter/GSFC/HSF ND
ACTION:	Contact SN Project management and inform them of user impact of maintaining the current TDRS naming convention.
0509-NSG-03	Bob Culbertson/JSC/GC Office
ACTION:	Determine if the crew has been briefed on the TDRS naming convention and the impact to selecting the proper satellites.
0509-NSG-04	Bob Culbertson/JSC/GC Office
ACTION:	Provide input via email to Mr. Jim Bangerter/GSFC/NASA/HSF ND outlining the safety implications of continuing the TDRS naming convention.
RESPONSE:	Mr. Culbertson provided input on May 26, 2009.
STSTUS:	This action item is **CLOSED**.
0509-NSG-05	Mark Harris/WFF
ACTION:	Provide a WFF NCPS replacement update to Mr. Jim Bangerter/ GSFC/NASA/HSF ND.

CLOSING REMARKS

Mr. Jim Bangerter thanked the attendees and presenters for their participation. Mr. Bangerter stated that the next NSG is tentatively set for the September 2009 timeframe.

Network Support Group Acronyms and Abbreviations

ACU	Antenna Control Unit
ADPE	Automated Data Processing Equipment
AFSCN	Air Force Satellite Control Network
AI	Action Item
ANCC	Auxiliary Network Control Center
ARTS	Automated Remote Tracking Station
ASI	Agenzia Spaziale Italiana
ASVM	Alternate State Vector Management
ATF	Aeronautical Tracking Facility
ATM	Asynchronous Transfer Mode
ATV	Automated Transfer Vehicle
BCC	Backup Control Center
CCB	Configuration Control Board
CDR	Critical Design Review
CDS	Conjunction Data Service
CIG	Customer Interface Group
CSA	Canadian Space Agency
CTP	Command and Telemetry Processors
DARS	Dryden Apple Replacement System
DCN	Documentation Change Notice
DFRC	Dryden Flight Research Center
DMR	Detailed Mission Requirements document
DR	Discrepancy Report
DTMF	Dual Tone Modulated Frequency
ELM – ES	Experiment Logistics Module – Exposed Section
EMCC	Emergency Mission Control Center
ESA	European Space Agency
ET	External Tank
ETE	End-to-end
EVA	Extra Vehicular Activity
FA	First Article
FAT	Factory Acceptance Testing
FCT	Flight Control Team
FD	Flight Director
FDF	Flight Dynamics Facility
FEP	Front End Processor
FEPR	FEP Replacement
FY	Fiscal Year

Network Support Group Acronyms and Abbreviations

GC	Ground Controller
GDIS	Guam Data Interface System
GS	Ground Segment
GSFC	Goddard Space Flight Center
GUTS	Guam Upgrade to the Timing System
HOSC	Huntsville Operations Support Center
HRDS	High Rate Data Switch
HSF	Human Spaceflight
HST	Hubble Space Telescope
HTV	H-II Transfer Vehicle
IDEA	ISS Downlink Enhancement Architecture
IFA	In Flight Anomaly
IN	Integrated Networks
IONet	Internet Protocol Operations Network
IP	Internet Protocol
IPS	Integrated Planning Systems
IRON	Inter-Range Operations Number
IRS	Integrated Receiver Sustainment
ISI	Interim Support Instruction
ISS	International Space Station
ISSP	ISS Program
JAXA	Japan Aerospace Exploration Agency
JEM	Japanese Experiment Module
JSC	Johnson Space Center
KAFB	Kennedy Forward/return Link
KFRL	Kennedy Forward/Return Link
KSA	K-band Single Access
KSC	Kennedy Space Center
LSIMSS	Linux based Scalable Integrated Multi-mission Support System
MA	Multiple Access
MBR	MILA Bermuda Re-Engineering
MCC	Mission Control Center
MDM	Multiplexer/Demultiplexer
MILA	Merritt Island Launch Annex
MIR	Mission Impact Report

Network Support Group Acronyms and Abbreviations

MOD	Mission Operations Directorate
MOVE	Mission Operations Voice Enhancement
MOU	Memorandum of Understanding
MPLM	Multi-purpose Logistics Module
MPLS	Multiprotocol Label Switching
MRT	Mission Readiness Test
MSFC	Marshall Space Flight Center
NACAIT	Network and Communications Analysis and Integration Team
NAM	Network Advisory Message
NASA	National Aeronautics and Space Administration
NCCDS	NCC Data System
NCPS	Network Command Processing System
NISN	NASA Integrated Services Network
NOIT	Network Operations Integration Team
NOP	Network Operations Procedure
NOSP	Network Operations Support Plan
NPRD	Network PRD
NSAP	Network Services Assurance Plan
NSG	Network Support Group
NSR	NISN Service Request
NTR	NSAP Technology Refresh
OAS	Onizuka Air Station
OCA	Orbiter Communications Adapter
ODAR	Obsolescence-Driven Avionics Redesign
PDL	Ponce de Leon
PDR	Preliminary Design Review
PIP	Premium Internet Protocol
PM	Preventative Maintenance
PMT	Pre Mission Telecon
POC	Point-of-Contact
PRD	Program Requirements Document
PSS	Portable Spacecraft Simulator
PTP	Programmable Telemetry Processor
RAIL	Rolling Action Item List
RF	Radio Frequency
RFA	Request for Action
RFP	Request fro Proposal
RSA	Russian Space Agency

Network Support Group Acronyms and Abbreviations

RTS	Remote Tracking Site
SAT	Site Acceptance Test
SCaN	Space Communications and Navigation
SCD	Small Conversion Device
SDR	System Design Review
SDTO	Station Development Test Objective
SDTW	Space Development Test Wing
SGL	Space-to-Ground Link
SGLT	Space-to-Ground Link Terminal
SGSS	SN Ground Segment Sustainment
SHO	Scheduling Order
SM	Servicing Mission
SMM	Spaceflight Mission Manager
SN	Space Network
SNAS	SN Access System
SNGS	SN Ground System
SOW	Statement of Work
SSA	S-band Single Access
SSM	Site Status Message
SSP	Space Shuttle Program
STGT	Second TDRSS Ground Terminal
TAL	Transoceanic Abort Landing
TCP/IP	Transmission Control Protocol/Internet Protocol
TDRS	Tracking and Data Relay Satellite
TDRSS	Tracking and Data Relay Satellite System
TE	
TOCC	TDRSS Operations Control Center
TNOSP	TDRSS NOSP
TTC	Tracking, Telemetry, and Command
TWTA	Traveling Wave Tube Amplifier
USA	User Services Access
USSR	User Services Subsystem Replacement
VAFB	Vandenberg Air Force Base
VHF	Very High Frequency
VV	Visiting Vehicle
WG	Working Group
WSC	White Sands Complex
WSGT	White Sands Ground Terminal