



---

# **H-II Transfer Vehicle-3 (HTV) Mission Operations Readiness Review (MORR)**

**May 24, 2012**  
**BASELINE 07/03/12**

**Presented to:**  
**NASA/Goddard Space Flight Center**  
**Networks Integration Management Office (NIMO), Code 450.1**



# Agenda

- 
- |   |   |  |   |
|---|---|--|---|
| <b>1. Welcome</b>   | <b>J. Bangerter</b>   | <b>5. Launch Activities</b>  | <b>M. Calhoun</b>   |
| <ul style="list-style-type: none"><li>• Review Board</li><li>• Purpose of the Mission Operations Readiness Review (MORR)</li></ul>  |   | <ul style="list-style-type: none"><li>• Launch Day Sequence of Events (Launch Count)</li><li>• IN Timeline Summary</li><li>• Freeze Plan</li></ul>   |   |
| <b>2. HTV-3 Mission Overview</b>  | <b>M. Calhoun</b>   | <b>6. Networks Status</b>  |   |
| <ul style="list-style-type: none"><li>• Project/Mission Summary</li><li>• Mission Summary</li><li>• International Space Station (ISS) Supply Sequence</li></ul>   |   | <ul style="list-style-type: none"><li>• Communications Service Office (CSO) Operations</li><li>• Space Network (SN) Operations</li><li>• Flight Dynamics Facility (FDF) Operations</li><li>• Network Integration Center (NIC) Operations</li><li>• Eastern Range (ER) Operations</li><li>• Points of Contact (POC)</li></ul> | C. Wiley<br>E. Richards<br>C. Ramirez<br>E. Mount<br>M. Gawel |
| <b>3. Integrated Networks (IN) Requirements</b>   | <b>M. Calhoun</b>   | <b>7. IN Summary</b>   | <b>M. Calhoun</b>   |
| <ul style="list-style-type: none"><li>• IN Requirements</li><li>• Launch Hold Criteria</li><li>• Networks Configuration</li><li>• Documentation</li></ul>   |   | <ul style="list-style-type: none"><li>• Risks and Issues</li><li>• Open Work</li><li>• Issues and Concerns</li><li>• Summary</li><li>• Remaining Mission Activities</li></ul>  |   |
| <b>4. Analysis and Testing</b>  |   | <b>8. Backup</b>   | <b>M. Calhoun</b>   |
| <ul style="list-style-type: none"><li>• Radio Frequency (RF) Analysis</li><li>• Networks Feasibility Analysis</li><li>• RF Compatibility Testing Results</li><li>• Networks Requirements Verification Summary</li><li>• HTV-3 Test Matrix</li></ul> | N. Huynh<br>C. Schwartz<br>J. Baros<br>M. Calhoun<br>M. Calhoun | <b>9. Certificate of Flight Readiness (CoFR) Signature Sheet</b>   |   |
|   |   | <b>10. Acronym List</b>  |   |
-



# Review Board

---

- **Carolyn P. Dent, Chairperson, GSFC, Code 301, Systems Review Office**
- **Scott A. Greatorex, GSFC, Code 450.1, Chief, Networks Integration Management Office**
- **John J. Hudiburg, GSFC, Code 599, 450 Senior Technical Authority**
- **Susan L. Hoge, GSFC, Code 595, Navigation and Mission Design Branch**
- **Bradford Butts, GSFC, Code 761, Systems Management Branch**
- **Joseph M. Aquino, JSC-DD13, Manager, Space Communications Integration Office**
- **Donald W. Shinnners, GSFC, Code 452, Space Network Project**
- **James A. Bangerter, GSFC, Code 450.1, Human Spaceflight Network Director**



# Purpose of the MORR

---

- **To demonstrate that the network has analyzed, tested and verified the requirements**
- **To ensure that all NASA Integrated Network (IN) elements are ready to provide the required services**



# **HTV-3 Mission Overview**

**M. Calhoun**

---



# Project/Mission Summary

---

- **The objectives of this mission are as follows:**
  - **HTV-3 is an unmanned resupply spacecraft developed by Japan Aerospace Exploration Agency (JAXA) to deliver equipment, spare parts and consumables to the International Space Station (ISS)**



# Mission Summary

---

- **Launch Date** 07/21/12
- **Day of Year (DOY)/Time** 203/0205:55Z
- **Backup Launch Window** To Be Determined (TBD)
- **Launch Vehicle/Site** H-IIB, JAXA's Tanegashima Space Center (TnSC) on Tanegashima Island
- **Primary Payload** 6 Tons (Supplies/Scan Test Bed)
- **Inclination** 51.6 degrees
- **Docking** 07/27/12 @ 209/12:10Z
- **Undocking** 08/26/12 (30 days docked) @ 208/1540Z
- **Re-entry** 08/27/12 @ 209/12:45:04Z



# ISS Supply Sequence

Date	Flight	Launch Vehicle/Elements
11/14/11	28S Russian Soyuz (Expedition 29)	Crew Transport, Logistics, and Re-supply
12/21/11	29S Russian Soyuz (Expedition 30)	Crew Transport, Logistics, and Re-supply
01/25/12	46P Russian Progress	Logistics and Re-supply
03/23/12	ATV 3	Logistics and Re-supply
04/20/12	47P Russian Progress	Logistics and Re-supply
05/15/12	30S Russian Soyuz (Expedition 31)	Crew Transport, Logistics, and Re-supply
05/19/12	Falcon 9 Dragon Demo 2	Demonstrate rendezvous and berthing with the International Space Station
07/15/12	31S Russian Soyuz (Expedition 32)	Crew Transport, Logistics, and Re-supply
07/21/12	HTV 3	Logistics and Re-supply
07/31/12	48P Russian Progress	Logistics and Re-supply
09/24/12	Falcon 9 Dragon 1	The first operational cargo delivery mission to the International Space Station
10/2012	Antares Cygnus 1 Demo 1	Test flight to the International Space Station (ISS)
10/15/12	32S Russian Soyuz (Expedition 33)	Crew Transport, Logistics, and Re-supply
11/01/12	49P Russian Progress	Logistics and Re-supply
12/05/12	33S Russian Soyuz (Expedition 34)	Crew Transport, Logistics, and Re-supply
12/26/12	50P Russian Progress	Logistics and Re-supply

**Red Date = Launch Planned**

**Gray Date = Completed Missions**



# **IN Requirements**

**M. Calhoun**

---



# IN Requirements

---

- **Requirement changes since the HTV-2 mission**
  - **Eastern Range (ER) C-band requirements have been changed to provide contingency only support**



# IN Requirements (cont'd)

- **CSO**

DBR ID	Requirements
• 533534	• <b>SYSTEM VERIFICATION</b> <ul style="list-style-type: none"><li>○ CSO/NISN will support a validation/ verification process that demonstrates technical performance, capabilities, and operational readiness of all CSO/NISN provided Ground to Ground communications services</li></ul>
• 544759	• <b>NETWORK MANAGEMENT</b> <ul style="list-style-type: none"><li>○ The Program requires the Mission Services Program to provide network management services for all communications networks. These services shall include, but not be limited to: scheduling, monitoring performance, providing status to the Program, and providing network configuration management</li><li>○ The networks provided shall be managed and operated in such a way as to minimize the need for operational interaction between network operators and Space Station Control Center(SSCC)/Payload Operations Integration Center (POIC) operators and/or payload users</li></ul>
• 553529	• <b>HTV S-BAND RETURN FROM WSC TO SSCC</b> <ul style="list-style-type: none"><li>○ The HTV S-band Single Access Return (SSAR) link data rate shall operate at 8 and 2 kbps. The HTV S-band Multiple Access (MA) Return link data rate operates at 2 kbps. The HTV S-band system can be operated coherently or non-coherently. HTV requirement for TDRSS coherent mode operation is for HTV tracking purposes only</li></ul>
• 553539	• <b>HTV S-BAND FORWARD SUPPORT FROM SSCC TO WSC</b> <ul style="list-style-type: none"><li>○ The HTV S-band forward link system shall operate at 250 bps</li></ul>
• 556504	• <b>DATA SERVICE MANAGEMENT CENTER (DSMC) INTERFACE</b> <ul style="list-style-type: none"><li>○ Communications interfaces between the SSCC, the Huntsville Operations Support Center (HOSC), and the NIC shall be provided</li></ul>

**NOTE: Failed requirements are marked in red text**



# IN Requirements (cont'd)

- SN

DBR ID	Requirements
• 533532	<ul style="list-style-type: none"><li>• <b>TRACKING AND DATA RELAY SATELLITE SYSTEM</b><ul style="list-style-type: none"><li>○ The Tracking and Data Relay Satellite System (TDRSS) Service shall support different ISS S-band systems as required. These systems currently consist of the ACS S-band system, Automated Transfer Vehicle (ATV) S-band system, HTV S-band system, and commercial entities vying for the Commercial Orbit Transportation System (COTS) contract. One Single Access (SA) service is required to support S and K-band RF link with a second SA service required during critical ISS operations such as rendezvous, Extravehicular Activity (EVA), Visiting Vehicle (VV) Launch, and other critical activities</li><li>○ The HTV S-band forward link system operates at 250 bps SSA only. The HTV S-band return link system operates in SSA at 8 kbps normal, or 2 kbps contingency. No SMA return link is required; however, a SMA return at 8 kbps may be scheduled and supported on a best effort basis. The HTV MA return link operates at 2 kbps normal. The HTV shall require continuous TDRSS forward and return link, including the Zone of Exclusion (ZOE) during critical phases of flight</li></ul></li></ul>
• 533542	<ul style="list-style-type: none"><li>• <b>WSC RECORDING INTERVAL</b><ul style="list-style-type: none"><li>○ The ATV and HTV S-band return links shall be recorded at the White Sands Complex (WSC) for all ISS elements and held for a period of 50 hours or longer if specifically requested. Playback shall be required in the event of communications or facility failures. Playback of S-band data shall occur simultaneously (on a separate channel) with real-time support. Playback of ATV and HTV S-band data shall utilize one common, shared playback channel. <i>NOTE: ACS and Ku-band return links are recorded by ISSOnet equipment located at WSC</i></li></ul></li></ul>

**NOTE: Failed requirements are marked in red text**



# IN Requirements (cont'd)

- **SN (cont'd)**

DBR ID	Requirements
• 534321	<ul style="list-style-type: none"><li>• <b>TDRSS GROUND STATION CONFIGURATION</b><ul style="list-style-type: none"><li>○ Ground Configuration Message Requests (GCMR) and GCMR acknowledgements are provided by the TDRSS Real Time Manager (TRM) and are routed via the ISSOnet to Goddard Space Flight Center (GSFC) for distribution to WSC at the TRM rate of less than 5 kbps. The SSCC shall provide conflict-free GCMRs and TDRSS link management for all ISS elements including ISS, ATV, HTV, and COTS</li></ul></li></ul>
• 558535	<ul style="list-style-type: none"><li>• <b>WSC QUALITY OF SERVICE</b><ul style="list-style-type: none"><li>○ The data systems at the WSC shall monitor the systems supporting the forward and return data services for all ISS elements, including COTS, ATV and HTV, requiring TDRSS support. User Performance Data (UPD) shall be transmitted to GSFC and sent to the SSCC and HOSC via the ISSOnet at a TRM rate of less than 5Kbps</li></ul></li></ul>

**NOTE: Failed requirements are marked in red text**



# IN Requirements (cont'd)

- FDF

DBR ID	Requirements
<ul style="list-style-type: none"><li>533540</li></ul>	<ul style="list-style-type: none"><li><b>TDRS STATE VECTORS</b><ul style="list-style-type: none"><li>When required, the GSFC FDF shall provide the SSCC and Back-up Control Center (BCC)-HOSC (when activated) with Tracking and Data Relay Satellite (TDRS) state vectors for ISS-to-TDRS pointing computations and for Visiting Vehicles –to- TDRS pointing computations to the SSCC. TDRS state vectors for ATV and HTV support will be supplied by the SSCC to the European Space Agency (ESA) and National Space Development Agency (NASDA) gateways as required. The TDRS state vectors accuracy requirement is 200 meters, three sigma. State vector formats are specified in JSC/GSFC Operational Communications Interface Control Document (ICD) for Mission Control Center (MCC) Systems (JSC 11534, Vol. 1, latest revision). Vectors will be transmitted between FDF and SSCC via ISSOnet</li></ul></li></ul>
<ul style="list-style-type: none"><li>533541</li></ul>	<ul style="list-style-type: none"><li><b>ISS TRANSMITTED FREQUENCY MEASUREMENT</b><ul style="list-style-type: none"><li>The GSFC FDF shall process Assembly Contingency Subsystem (ACS) S-band, ATV S-band, HTV S-band, and Ku-band one way Doppler data to be used for determining the operational short and long term stability of the ISS transponders. This processing shall be provided, when scheduled, until transponders frequency shift signatures are established for all S-band services and the Ku-band services. Results shall be provided to the SSCC for use in estimating the required frequency information in the TDRSS scheduling and ground control messages</li><li>The responsible Visiting Vehicle control center shall process appropriate data to be used for determining the operational short and long term stability of the transponders. This processing shall be provided when scheduled until transponder frequency shift signatures are established for S-band services. Results shall be provided to the SSCC, ATV-CC, and HTV-CC for use in estimating the required frequency information in the TDRSS scheduling and ground control messages</li></ul></li></ul>

**NOTE: Failed requirements are marked in red text**



# IN Requirements (cont'd)

- **FDF (cont'd)**

DBR ID	Requirements
<ul style="list-style-type: none"><li>• 534319</li></ul>	<ul style="list-style-type: none"><li>• <b>OPERATIONAL CONCEPTS – GENERAL</b><ul style="list-style-type: none"><li>○ Flight Dynamics Facility: Located at GSFC in Greenbelt, Maryland, the FDF will provide state vector data and tracking data evaluation support for the ISS, ATV, HTV, and Soyuz missions. The FDF also has the ability to provide orbit determination support if required. Real-time support is also provided for Space Shuttle missions and Expendable Launch Vehicles (ELV). Support is provided for TDRSS performance assessment for the NEN/TDRSS System using tracking data from the ISS, scientific satellites, and special test. TDRSS support includes state vector generation, orbit determination, tracking data evaluation, spacecraft maneuver support, and testing to verify and improve TDRSS pointing accuracy. The FDF also provides spacecraft planning products to the DSMC and other spacecraft and Launch vehicle control centers</li></ul></li></ul>
<ul style="list-style-type: none"><li>• 551187</li></ul>	<ul style="list-style-type: none"><li>• <b>ISS STATE VECTORS</b><ul style="list-style-type: none"><li>○ The Johnson Space Center (JSC) SSCC and BCC-HOSC (when activated) shall provide, as required ISS, ATV, HTV, and Soyuz acquisition data to the TDRS via GSFC FDF. The ATV and HTV acquisition data shall be provided by the ATV and HTV Control Centers, respectively, to the SSCC. State Vector formats are specified in JSC/GSFC Operational Communications ICD for MCC Systems (JSC 11534, Vol. 1, latest revision). Vectors will be transmitted between FDF and SSCC via ISSOnet</li></ul></li></ul>

**NOTE: Failed requirements are marked in red text**



# IN Requirements (cont'd)

- **NIC**

DBR ID	Requirements
<ul style="list-style-type: none"><li>• 533534</li></ul>	<ul style="list-style-type: none"><li>• <b>SYSTEM VERIFICATION</b><ul style="list-style-type: none"><li>○ GSFC will support a validation/verification process that demonstrates compatibility, technical performance, capabilities, and operational readiness between ISS elements and the TDRSS, Ground Network (GN), and Very High Frequency (VHF) communication systems</li></ul></li></ul>

- **ER**

DBR ID	Requirements
<ul style="list-style-type: none"><li>• 556069</li></ul>	<ul style="list-style-type: none"><li>• <b>C-BAND RADAR SUPPORT</b><ul style="list-style-type: none"><li>○ NASA and Department of Defense (DoD) C-band radar will support as required ISS free flyer Visiting Vehicles. Soyuz, HTV, and ATV currently do not require routine C-band support but may require real-time contingency data via MOD C-band Contingency Call-up Procedure</li></ul></li></ul>

**NOTE: Failed requirements are marked in red text**



# Launch Hold Criteria

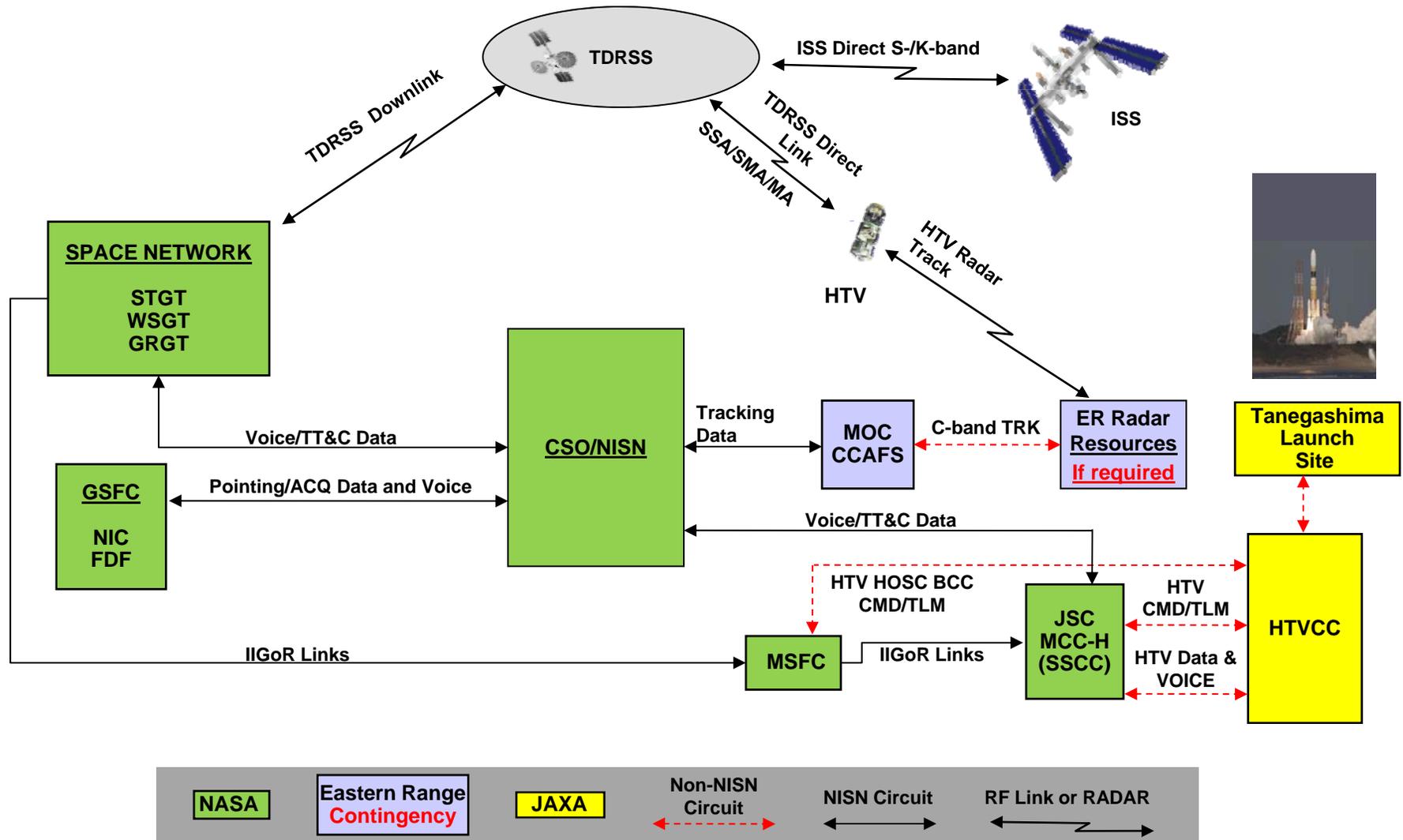
---

---

Requirement	Interval
Mandatory	TDRS support
Required	TDRS support is required as part of the Launch criteria for HTV



# Networks Configuration





# Documentation

Document Title	Document Number/Version	Effective Date	Future Issue Date
H-II Transfer Vehicle (HTV) Annex to the TNOSP for the International Space Station (ISS)	450-TNOSP-ISS, HTV Annex Original	11/12/09	
ISS Program Requirements Document (PRD)	Volume I	Active Database	
RF Compatibility Test Plan/Report for the Proto-Flight Model (PFM) H-II Transfer Vehicle (HTV) Transponder and the Space Network (SN) (2 <sup>nd</sup> Test Plan)	Original	07/2010	
RF Compatibility Test Report	450-CTP-HTV	06/2006 & 07/2007 & 8/2010	
NENS-CCE-CTP/R-0317		08/09/10	
Radio Frequency Interface Control Document (RFICD) between HTV and TDRSS	450-RFICD-HTV/TDRSS, Original w/DCN 003	11/2003 & 05/2009	
HTV-ISS Joint Flight Rules	NSTS-12820 Volume F, Final w/PCN 002	01/11/11 PCN -2 02/16/11	
Launch Schedule Request			
ISI 001 – Mission Status		L-10	
ISI 002 – Launch Count		L-7	
ISI 003 – Critical Mission Period Restrictions		L-7	
ISI 004 – Hardware/Software Freeze		L-7	
ISI 005 – TDRS Support Total		L-7	
ISI 006 – Meet Me Number		L-7	
ISI 007 – C-band Schedule		L-7	
ISI 008 – Vector Management during Undock		L-7	
ISI 009 – WSC Auto Throughput		L-7	
ISI 010 – Mission Termination		Upon release from JSC	
Waivers (If applicable)	N/A		
Lessons Learned Review		Post Mission	
Post-Mission Report (PMR)	HTV-3 PMR	Post Mission	



---

# **Analysis and Testing**

---



---

# RF Analysis

N. Huynh

---



# RF Analysis Summary

---

- **Forward Services through the SN (nominal frequency of 2106.4 MHz):**
    - **The HTV command (250 bps) may be requested for SSA, SMA, or MA**
    - **For critical operations or in case of an emergency in which the HTV loses attitude, SSA or SMA services are used for the forward link**
    - **The HTV receiver was not originally required to support SMA and MA forward services; therefore, there is a risk (best-effort) for SN support of HTV Multiple Access Forward (MAF) and S-band Multiple Access Forward (SMAF) services**
      - **MA support is not a requirement**
- Note: Per HTV/SN RF compatibility test, the HTV receiver is RF compatible SN SMAF and MAF*
- **All forward link margins are positive**



## RF Analysis Summary (cont'd)

- **Return Services through the SN (nominal frequency of 2287.5 MHz):**

HTV Mode	HTV Transmit Antenna	Data Rate	SN Return Services that may be Requested by HTV Project
Normal Ops	Zenith	8 kbps	SSA, SMA, or MA
Critical Ops	Zenith	8 kbps	SMA or SSA
Off-Nominal or Contingency Ops	Zenith	2 kbps	SSA, SMA, or MA
Emergency Ops	Zenith and Nadir	8 kbps (preferred) or 2 kbps	SMA or SSA

- There is a risk for SN support to HTV Multiple Access Return (MAR) and S-band Multiple Access Return (SMAR) 8 kbps due to a negative link margin
  - All other return service margins result in positive values using specified values, except for SMAR 2 kbps support through both the Zenith and Nadir antennas; however, link margin is positive using 2007 compatibility test measurement data
- **RFICD is in the process of being updated to reflect additional potential support modes. These support modes have been considered in this summary**



# RF Forward Link Coverage

Service	Data Rate (kbps)	Modulation	Coding	S/C Receiving Antenna	S/C G/T (dB/K)	Elevation Angle (Note 2)	On-orbit Link Margin (dB) (BER=10 <sup>-5</sup> )
SSAF (Normal Power Mode)	0.250	SS-UQPSK	None (Note 1)	Zenith and Nadir	-32.7	0 deg	9.2
SMAF (Note 1)						0 deg	7.6
MAF (Note 1)						30 deg	0.3

### Notes

1. The HTV receiver was not originally required to support SMA and MA forward services; therefore, there is a risk for SN support of HTV SMAF and MAF
2. 30 deg elevation angle applicable for normal operations. 0 deg elevation angle applicable for off-nominal, contingency or emergency operations. If link margins are positive at 0 deg elevation angle, the 30 deg elevation angle case is not included as the link will provide a 10<sup>-5</sup> Bit Error Rate (BER)



# RF Return Link Coverage

Service	Data Rate (kbps)	Modulation	Coding	HTV Transmit Antenna	S/C EIRP (dBW)	Minimum Elevation Angle (deg) (Note 1)	On-orbit Link Margin (dB) (BER=10 <sup>-5</sup> )
SSAR	8	SQPN	Rate ½ Conv.	Zenith	6.7	0	4.2
SSAR	2			Zenith and Nadir	3.7	0	7.3
SSAR	8			Zenith and Nadir	3.7	0	1.3
SMAR	2			Zenith	6.7	0	2.5
SMAR	2			Zenith and Nadir	3.7	0	-0.5 (WSC Spec)
SMAR	2			Zenith and Nadir	3.7	0	2.5 (Compat Test)
MAR	2			Zenith	6.7	0	0.7

## Notes

- 30 deg elevation angle is applicable for normal operations. 0 deg elevation angle is applicable for off-nominal, contingency or emergency operations. If link margins are positive at 0 deg elevation angle, the 30 deg elevation angle case is not included as the link will provide a 10<sup>-5</sup> BER
- HTV Zenith Only Transmit Antenna is applicable for normal, critical, off-nominal, or contingency operations. HTV Zenith and Nadir Transmit Antennas are applicable for emergency operations (HTV loses attitude)
- There is a risk to SN support of HTV for any link that results in a negative link margin
- Compat Test margins are based on 2007 compatibility relay test results, where implementation loss 1.5 dB and no additional user constraint loss is considered



# RF Return Link Coverage

## (HTV Project Requested Support on a Best-Effort Basis)

Service	Data Rate (kbps)	Modulation	Coding	HTV Transmit Antenna	S/C EIRP (dBW)	Minimum Elevation Angle (deg)	On-orbit Link Margin (BER=10 <sup>-5</sup> )
SMAR	8	SQPN	Rate ½ Conv.	Zenith	6.7	30	-2.8 (WSC Spec)
SMAR	8			Zenith	6.7	30	0.2 (Compat Test)
SMAR	8			Zenith	6.7	0	-3.5 (WSC Spec)
SMAR	8			Zenith	6.7	0	-0.6 (Compat Test)
SMAR	8			Zenith and Nadir	3.7	0	-6.5 (WSC Spec)
SMAR	8			Zenith and Nadir	3.7	0	-3.6 (Compat Test)
MAR	8			Zenith	6.7	30	-4.6

### Notes

1. 30 deg elevation angle is applicable for normal operations. 0 deg elevation angle is applicable for off-nominal, contingency or emergency operations. If link margins are positive at 0 deg elevation angle, the 30 deg elevation angle case is not included as the link will provide a 10<sup>-5</sup> BER
2. HTV Zenith Only Transmit Antenna is applicable for normal, critical, off-nominal, or contingency operations. HTV Zenith and Nadir Transmit Antennas are applicable for emergency operations (HTV loses attitude)
3. There is a risk to SN support of HTV for any link that results in a negative link margin.
4. Compat Test margins are based on 2007 compatibility test results, where implementation loss 1.5 dB and no additional user constraint loss is considered



---

# **Networks Feasibility Analysis**

**C. Schwartz**

---



# Networks Feasibility Analysis Summary

---

- **Evaluations of Forecast Period HTV post-launch requirements indicate no additional impacts should be expected than is currently experienced in scheduling for any other Expendable Launch Vehicle (ELV) or Launch and Early Orbit Phase (LEOP) customer using SN S-band Single Access (SSA) service as long as the launch window duration is minimized:**
    - **HTV may require up to continuous SSA (forward/return) SSAF/R service for critical periods from pre-launch until ISS docking as well as from 1 hour prior to undocking until re-entry:**
      - **Will use TD171, TDS & TDZ**
      - **Will minimize both TDZ and TDZ SA1 usage (except for critical events)**
    - **HTV will schedule at least 20 minutes of SSA service per orbit during above defined periods, i.e., launch to docking and undocking to re-entry**
  - **Proposed method of scheduling either SSA or multiple access (MA)/enhanced MA (SMA) services (no restrictions on MA/SMA other than not available from TDE) should not cause any impact issues with other customer commitments**
-



# **RF Compatibility Testing Results**

**J. Baros**

---



# RF Compatibility Testing Results

---

- **HTV S-band transponder, built by Mitsubishi Electric Corporation (MELCO), was successfully tested for RF compatibility at the GSFC Compatibility Test Laboratory (CTL) from 03/03-12/10**
  - **Test Report dated 08/09/10: RF Compatibility Test Plan/Report for the PFM HTV Transponder and the SN**
  - **Tests were conducted on the HTV PFM transponder, diplexer and functional Flight Equivalent Unit (FEU) for the Command Data Processor (CDP). Data was generated by a CTL bit-error-rate test unit for local tests and CDP for live sky tests**
  - **HTV (MELCO) PFM Transponder is RF compatible with SN**
  - **No anomalies were found during the RF compatibility test**



# RF Compatibility Testing Results (cont'd)

---

- **HTV S-band transponder, built by MDA Corporation, and associated components were successfully tested for RF compatibility with the SN at the GSFC CTL from 04/17-26/07**
  - **Test Report dated 07/31/07: RF Compatibility Test Report for the PFM HTV Inter-Orbit System (IOS) Transponder/TDRSS Compatibility Tests**
  - **Tests were conducted on the HTV PFM transponder, diplexer, and CDP1 FEU**
  - **HTV PFM Transponder is RF compatible with SN**
  - **No anomalies were found during the RF compatibility test**



---

# **Networks Requirements Verification Results**

**M. Calhoun**

---



# Networks Requirements Verification Summary

---

- **Testing Summary**
  - **HTV-3 TDRS Link Dataflow via BCC-HOSC 01/18/12 – Objectives not met**
    - **The purpose of this test was to verify the new Data Distribution Switch (DDS) installed at MSFC**
    - **Problems with both command and telemetry. MSFC was tasked with investigating their systems, especially the new DDS for a possible cause**
    - **MSFC's investigation revealed that there was a cabling issue with the ports on MSFC SCD's 3, 4 and 5. Also, there were clock/data problems on the SCD interfaces. MSFC corrected these problems**
  - **HTV-3 BCC-HOSC Command Test 01/24/12 – Objectives met**
    - **Command source was MSFC**
  - **HTV-3 TDRS Link Dataflow via BCC-HOSC #2 01/30/12 w/ JAXA – Objectives partially met**
    - **Telemetry test was nominal. Commands experienced a 19 seconds delay due to a buffering problem with the MSFC SCDs**



# Networks Requirements Verification Summary (cont'd)

- **Testing Summary (cont'd)**
  - **HTV-3 TDRS Ground Segment Link End-to-End Test 03/14-16/12 – Objectives met**
    - **JAXA decided not to test the BCC-HOSC command due to the buffering issue with the MSFC SCDs. MSFC awaiting new SCD from CSO/NISN**
    - **MSFC received new SCD 4 with upgraded software 7.0F on 05/07/12. Coordinating new test date**

<b>Pending Test Efforts</b>	<b>Test Date</b>
BCC-HOSC Checkout with JAXA (Testing new MSFC SCD 4 with 7.0 software)	05/2012
BCC-HOSC Checkout with JAXA due hurricane season. (Test date dependent upon MSFC SCD 4 test)	06/20/12
FDF Vector Verification Tests	L-7
WSC Mission Readiness Test (MRT)	L-3
Pre-mission Voice Circuit checkout w/ JSC, WSC and GSFC	NLT L-1



# HTV-3 Test Matrix

<b>HTV-3 Networks Service Requirements Test Matrix</b>  Green - Successfully Completed Green A - Done by Analysis Yellow - Partially Successful Red - Failed Black - Not Applicable (N/A) White - To Be Tested		HTV-3 TDRS Link Dataflow via BCC-HOSC (01/18/12)	HTV-3 BCC-HOSC Command Test (01/24/12)	HTV-3 TDRS Link Dataflow via BCC-HOSC #2 (01/30/12)	HTV-3 TDRS Link End-to-End Test (03/14-16/12)	HTV-3 TDRS Link Dataflow via BCC-HOSC #3 (05/20/12)	HTV-3 TDRS Link Dataflow via BCC-HOSC #4 (06/20/12)	Vector Verification (L-7 days)	WSC MRT (L-3 days)	Pre-mission Circuit Checkout NLT (L-1 days)	Verified by Analysis	Current Status
		<b>CSO Requirements</b>										
DBR # 544759	NETWORK MANAGEMENT	Green	Green	Green	Green	White	White	White	Black	White	Black	Green
DBR # 553529	HTV S-BAND RETURN FROM WSC TO SSCC	Green	Green	Green	Green	White	White	White	Black	White	Black	Green
DBR # 553539	HTV S-BAND FORWARD SUPPORT FROM SSCC TO WSC	Red	Green	Red	Green	White	White	White	Black	White	Black	Yellow
DBR # 556504	DSMC INTERFACE	Green	Green	Green	Green	White	White	White	Black	White	Black	Green
<b>SN Requirements</b>												
DBR # 533532	TRACKING AND DATA RELAY SATELLITE SYSTEM	Green	Green	Green	Green	White	White	White	Black	White	Black	Green
DBR # 533542	WSC RECORDING INTERVAL	Green	Green	Green	Green	White	White	White	Black	White	Black	Green
DBR # 534321	TDRSS GROUND STATION CONFIGURATION	Green	Green	Green	Green	White	White	White	Black	White	Black	Green
DBR # 558535	WSC QUALITY OF SERVICE	Green	Green	Green	Green	White	White	White	Black	White	Black	Green



# HTV-3 Test Matrix (cont'd)

<b>HTV-3 Networks Service Requirements Test Matrix</b>  Green - Successfully Completed Green A - Done by Analysis Yellow - Partially Successful Red - Failed Black - Not Applicable White - To Be Tested		HTV-3 TDRS Link Dataflow via BCC-HOSC (01/18/12)	HTV-3 BCC-HOSC Command Test (01/24/12)	HTV-3 TDRS Link Dataflow via BCC-HOSC #2 (01/30/12)	HTV-3 TDRS Link End-to-End Test (03/14-16/12)	HTV-3 TDRS Link Dataflow via BCC-HOSC #3 (05/20/12)	HTV-3 TDRS Link Dataflow via BCC-HOSC #4 (06/20/12)	Vector Verification (L-7 days)	WSC MRT (L-3 days)	Pre-mission Circuit Checkout NLT (L-1 days)	Verified by Analysis	Current Status
		<b>FDF Requirements</b>										
DBR # 533540	TDRS STATE VECTORS	Green	Green	Green	Green	White	White	White	Black	White	Black	Green
DBR # 533541	ISS TRANSMITTED FREQUENCY MEASUREMENT	Black	Green	Green	Black	Black	White	White	White	White	Black	Green
DBR # 534319	OPERATIONAL CONCEPTS – GENERAL	Green	Green	Green	Green	White	White	White	Black	White	Black	Green
DBR # 551187	ISS STATE VECTORS	Green	Green	Green	Green	White	White	White	Black	White	Black	Green
<b>NIC Requirements</b>												
DBR # 533534	SYSTEM VERIFICATION	Green	Green	Green	Green	White	White	White	White	White	Black	Green
<b>ER Requirements</b>												
DBR # 556069	C-BAND RADAR SUPPORT	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black	Green



# **Launch Activities**

**M. Calhoun**

---



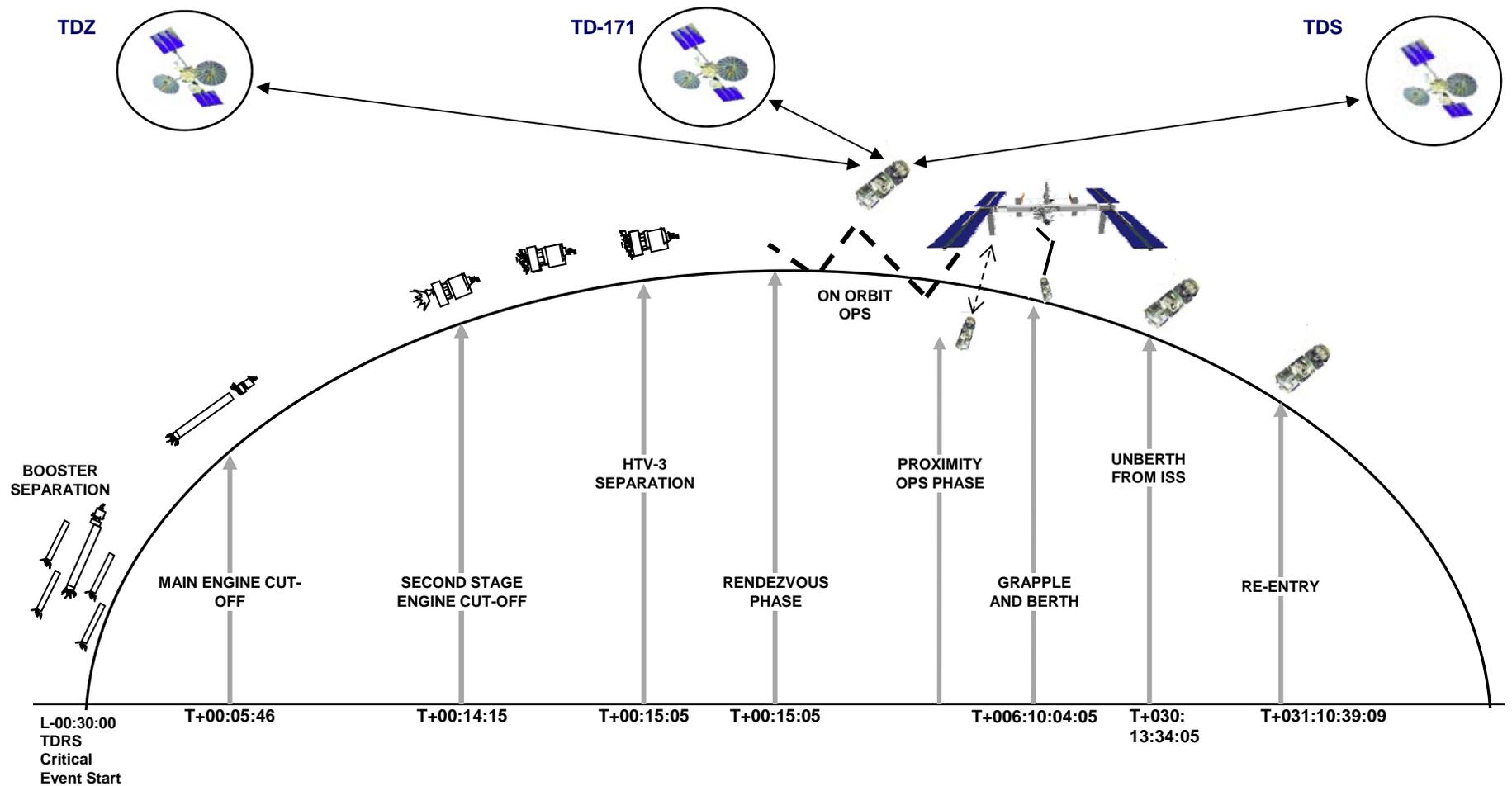
# Launch Day Sequence of Events (Launch Count)

---

- **Spaceflight Mission Manager (SMM) Launch Activities**
  - **L-08:00:00** Request Voice Controller to establish voice circuits
  - **L-06:15:00** Conduct a launch briefing with FDF and WSC on TDRS-3
  - **L-6:00:00** WSC tape playback and command check
  - **L-1:00:00** GCMR verification checkout with JSC and WSC
  - **L-0:30:00** Start of TDRS 171 event
  - **T + 0** Liftoff
  - **T + 00:10:00** Start of TDRS Service
- **SMM Mission Staffing**
  - TDRSS critical periods
  - Launch through Docking
  - 3 hours prior to undocking through re-entry



# IN Timeline Summary



**LPAs**  
TLM: 0247  
CMD: 0409 (JSC)  
CMD ECHO: 0262

**Mission data rates**  
CMD: 250 bps  
TLM: 8kbps/2kbps (contingency)



# Freeze Plan

- **Hardware/Software freeze will be implemented for the IN resources as follows:**

Network Service	Freeze Duration
SN	All applicable software systems will be frozen following successful Vector Verification Testing. All applicable hardware systems will be frozen following successful WSC MRT (L-3 approx.)
FDF	After Vector Verification test
NIC	After Vector Verification test
CSO/NISN	L-24 hours
ER	N/A – will provide status 24 hours prior to launch

- **Exemptions shall be approved prior to implementation**
- **Maintenance and testing restrictions are imposed for all network elements during mission-critical periods**
- **The Network Director (ND) coordinates all freeze waivers for necessary work in accordance with the Configuration Management Freeze Policy (CMFP), 450-CMFP-HSF/ELV**



---

# Networks Status

---



# **CSO Operations**

**C. Wiley**

---



# CSO Operations

- CSO Operations

<b>Voice</b>	<b>Participants</b>
ISS Site Coord	JSC, NIC, FDF, WSC, MSFC
IP/GC-1	JSC, NIC, WSC, MSFC
ISS TN Coord	JSC, NIC, FDF, WSC, MSFC
Lead Range Coord	NIC, FDF, KSC-CD&SC/ER
Track Coord	JSC, NIC, FDF, KSC-CD&SC/ER
<b>Data</b>	<b>Participants</b>
SSA/MA Telemetry: 8 kbps / 64 kbps	WSC, JSC, MSFC HOSC BCC and NIC
SSA/MA Command and Command Echo 2 kbps	JSC, WSC and NIC
SSA/MA Command Backup	MSFC HOSC BCC and NIC
2.4 kbps LTAS Data (C-band)	ER via CD&SC to FDF
Notes	



# CSO Operations (cont'd)

- CSO configuration changes since the last VV mission

Type	System	Significant Changes
Software	None	<ul style="list-style-type: none"> <li>• None</li> </ul>
Hardware	Mission Operations Voice Enhancement (MOVE) Type "D" Keypad Retrofit	<ul style="list-style-type: none"> <li>• 414 Type D Keypads deployed at GSFC (379 installed with 35 spares)</li> <li>• All 414 keypads have been retrofitted and 379 deployed</li> </ul>
	Nortel Router Project Upgrade	<ul style="list-style-type: none"> <li>• Current Network routers are obsolete and not supported by vendor</li> <li>• All equipment has been delivered to sites and in different stages of installation by Host Centers</li> <li>• TRR was completed on 04/04/12</li> <li>• No new routers have been connected to the operational Network</li> <li>• Project completion date currently scheduled for April or May 2013</li> </ul>
	MSFC SCD	<ul style="list-style-type: none"> <li>• The MSFC SCD had buffering problems with the HTV-3 commands which caused a 19 second delay in the commands from JAXA</li> <li>• A new SCD loaded with the upgraded 7.0 software was shipped to MSFC</li> <li>• This upgraded software is supposed to mitigate the command delay from 19 seconds to 2 seconds</li> <li>• The SCD is currently installed and operational – 05/10/12</li> <li>• Testing is being conducted 06/07/12-06/08/12</li> </ul>
	IDEA/IIGoR	<ul style="list-style-type: none"> <li>• The MCC and MSFC teams successfully transitioned the ISS Ku-band data from the IDEA network to the IIGoR network on 05/10/12</li> <li>• IDEA is scheduled to be turned down on 07/01/12</li> </ul>

- Open NICS Information Technology Service Management (NITSM) Tickets
  - None



# CSO Operations (cont'd)

---

- **Documentation**
  - There are no outstanding documentation items
- **Staffing**
  - Staffing is sufficient to meet all requirements
- **Training**
  - All required personnel are trained and certified
- **CSO will process all Freeze Exemption Requests (FER) during mission in accordance with CSO SOP-002, published 10/2009**
- **CSO is ready to support the HTV-3 mission**



# **SN Operations**

**E. Richards**

---



# SN Operations

- **SN Operational Changes since the last VV mission**

Type	System	Significant Changes
Software	Data Interface System (DIS)	• MSA1000 (Firmware delivery to DIS disk drives): Second TDRSS Ground Terminal (STGT) 02/21/12, White Sands Ground Terminal (WSGT) 04/04/12
	DIS	• RD422RPL (RS422 Replacement): WSGT 02/28/12 and STGT 03/07/12
	Network Control Center Data System (NCCDS)	• FDF001 (FDF Modernization): 02/29/12
	DIS, User Subsystem (USS), Exec, Tracking Telemetry and Control (TT&C)	• Ops-003/Ports-001: 05/15/12 STGT, 05/23/12 WSGT
Hardware	GRGT Shuttle Unique Equipment (SUE)	• Equipment was shipped to WSC 04/30/12
	MOVE	• WSC has 261 keysets, as of 05/14/12 155 keysets have been retrofitted

- **Open DR: None**
- **WSC Engineer and Vector Controller will be on site at L-8 hours**



# SN Operations (cont'd)

---

- **Documentation**
  - There are no outstanding documentation items
- **Staffing**
  - Staffing is sufficient to meet all requirements
- **Training**
  - All required personnel are trained and certified
- **SN is ready to support the HTV-3 mission**



# **FDF Operations**

**C. Ramirez**

---



# FDF Operations

---

- **FDF configuration changes since the last VV mission**

Type	System	Significant Changes
Software	None	• None
Hardware	None	• None

- **Open DRs**
  - None
- **Documentation**
  - There are no outstanding documentation items



# FDF Operations (cont'd)

---

- **Staffing**
  - Staffing is sufficient to meet all requirements
- **Training**
  - All required personnel are trained and certified
- **FDF is ready to support the HTV-3 mission**



---

# NIC Operations

**E. Mount**

---



# NIC Operations

- **NIC configuration changes since the last VV mission**

Type	System	Significant Changes
Software	None	<ul style="list-style-type: none"><li>• None</li></ul>
Hardware	NIC console equipment	<ul style="list-style-type: none"><li>• Console equipment is being relocated within the NIC to accommodate the NIC reconfiguration effort</li><li>• No hardware changes are being done</li><li>• Reconfiguration effort includes equipment movement and the installation of applicable cabling</li><li>• All systems will be tested prior to any Network Freeze to ensure reliability</li></ul>

- **Open DRs**
  - None
- **Documentation**
  - There are no outstanding documentation items



# NIC Operations (cont'd)

- **FER**

Item	Status	Comments
GSFC Steam Restoration Project	Approved	Excavation, removal and replacement of site steam and condensate distribution pipe between STMH 1 in front of Building 11 to STMH 4 in front of Building 6, generally parallel to and Southwest of Explorer Road

*\*Note : Any FER's that are issued following this MORR will be submitted to the ND for review and approval*

- **Facilities Overview**

Item	Status	Comments
Commercial Power	G	
Mission Management Area (MMA)	G	
Uninterruptible Power Supply (UPS)	G	
Heating, Ventilating and Air Conditioning (HVAC)	G	



# NIC Operations (cont'd)

---

- **Staffing**
  - Staffing is sufficient to meet all requirements
  - NIC personnel will be on-site from L-8 hours until released from Launch support
  - NIC personnel will also be on-site for critical events and on an as needed basis as required
- **Training**
  - All required personnel are trained
- **NIC is ready to support the HTV-3 mission**



# ER Operations

M. Gawel

---



# ER Operations

---

- **ISS VV are not routinely supported by the DoD C-band Radars. If a contingency is declared by the ISS Ground Controller (GC) during a VV mission, the ranges have agreed C-band radars will provide VV contingency support within agreed upon call-up times for Nominal and Off-duty hours. Support will be provided on a best-obtainable basis**
- **Interim Support Instruction (ISI) for C-band Radar Contingency Call-up Procedures will be published prior to mission**
- **Prior to L-10 ER will send any updates for POC's for the ISI**
- **ER will provide radar status prior to the mission to the Human Spaceflight (HSF) ND and SMM**



# ER Operations (cont'd)

---

- **Procedure**
  - **ISS GC will declare a VV contingency**
  - **ISS GC will announce whether C-band radar support is needed**
  - **All declared VV contingencies will be confirmed via E-mail, facsimile or memorandum from ISS GC to DoD Track**
  - **DoD Track will schedule C-band radar support**
    - **DoD Track has normal and off operating hours and points of contact for supporting radar sites identified in ISI**
  - **Following termination of contingency conditions, the ISS GC will verbally notify SMM and/or DoD Track to release C-band radar sites from support**
  - **ISS GC will also release confirmation message as soon as possible**



---

# **Point of Contacts (POC)**

**M. Calhoun**

---



# POC

Position	Personnel	Location	Launch Support	Contact Information
ND	<u>Jim Bangerter</u>	GSFC	L-8 hours	(C) 301-286-1819 (O) 301-286-7306; James.A.Bangerter@nasa.gov
Network Manager (NM)	<u>Melissa Blizzard</u>	GSFC	L-8 hours	(C) 301-286-1820 (O) 301-823-2622; Melissa.Blizzard@exelisinc.com
Lead Mission SMM	<u>Melvin Calhoun</u>	GSFC	L-10 hours	(C) 301-286-1824 (O) 301-823-2644; Melvin.Calhoun@exelisinc.com
SMM	<u>Elizabeth Clark</u>			(O) 301-823-2625; Elizabeth.Clark@exelisinc.com smmconsole@ncc-comm.gsfc.nasa.gov
NIC Site Mgr	<u>Eric Mount</u>	GSFC	L-8 hours	(O) 301-286-0601; eric.s.mount@nasa.gov
Mission GC	Aaron Frith	JSC	L-7 hours	(C) 281-244-5279 (O) 281-244-8074; Edward.A.Frith@nasa.gov
Mission GC	Charles Wilson	JSC	L-7 hours	(C) 281-244-5279 (O) 281-483-6877; Charles.R.Wilson@nasa.gov
SN Engineering Technical Operations and Analysis (TO&A)	Erik Richards Steve Traversy	WSC	L-7 hours	(C) 575-527-7185 (O) 575-527-7120; Erik.Richards@nasa.gov (O) 575-527-7370; Straversy@wsc.nasa.gov toa_eng@wsc.nasa.gov
FDF	<u>Crystal Ramirez</u>	GSFC	L-7 hours	(C) 301-286-8191 (O) 301-286-2197; crystal.e.ramirez@nasa.gov
CSO Mission Communications Manager (MCM)	<u>Claudette Wiley</u>	GSFC	L-5 hours	(C) 301-286-6141 (O) 301-286-1807; Claudette.S.Wiley@nasa.gov
Program Support Manager (PSM) DoD Track	Michael Gawel Ronnie Brautigam	ER	Contingency Support	(C) 321-853-9555 / 321-853-8645 (O) 321-853-8118; Michael.Gawel@patrick.af.mil (O) 321-853-8150; Ronnie.Brautigam.ctr@patrick.af.mil

Critical GSFC Personnel are listed in **RED**  
O – Office      C – Console



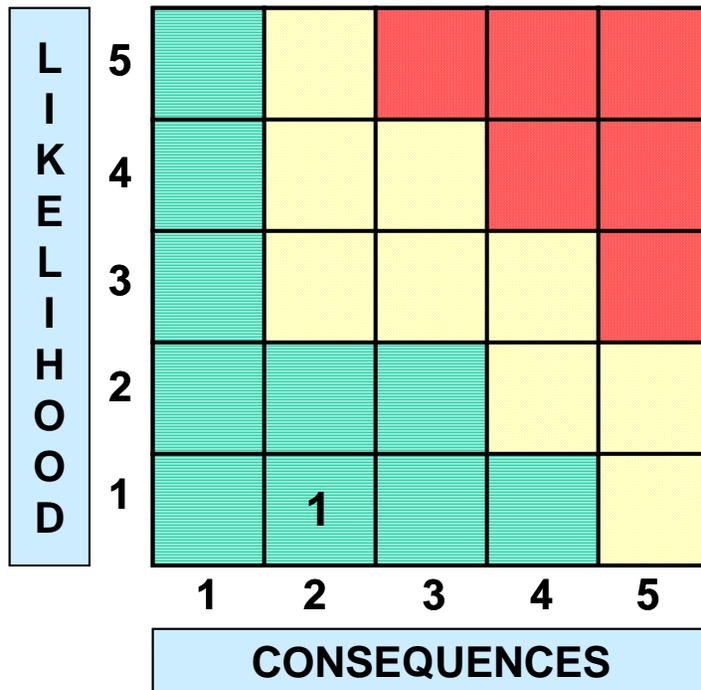
# **IN Summary**

**M. Calhoun**

---



# Risks



LxC Trend	Rank	Approach	Risk Title
*	1	M	HTV-3 SMAR 8kb support

<u>Criticality</u>	<u>L x C Trend</u>	<u>Approach</u>
<b>High</b>	↓ Decreasing (Improving)	M – Mitigate
<b>Med</b>	↑ Increasing (Worsening)	W – Watch
<b>Low</b>	➡ Unchanged	A – Accept
	* New since last mission	R – Research



# Risks (cont'd)

## HTV-3 SMAR 8kb support Risk

Rank	Risk Statement	Approach & Plan	Comments
1 	<p>If TDRS SSAR resources are not available for HTV-3 8kb supports</p> <p>Then, the 8kb support will have to be supported on TDRS MAR and SMAR links. Compatibility testing indicates that data drops may occur due to a negative link margin</p>	<p>Continue to support with this known risk. HTV-1 and HTV-2 have been supported with this risk with no impact to either mission</p>	<p>Detailed Test Objective (DTO) supports were conducted as an engineering test during HTV-1. The HTV receiver maintained continuous lock during the DTO events</p> <p>In addition, MA/SMA supports were scheduled during the HTV-2 mission. Again, there were no problems with the supports</p> <p>JAXA plans to schedule MA/SMA supports during the HTV-3 mission</p>

Risk Criticality   



# Open Work

---

- **Standard Open Work**
  - **BCC-HOSC test 06/2012 (hurricane season)**
    - **Test date is TBD**
  - **FDF Vector Verification Test (L-7)**
  - **WSC MRT (L-3)**
  - **Pre-mission voice checkout (NLT L-1 day)**
  - **2 days prior to undocking circuit checkout**
- **Non-Standard Open Work**
  - **BCC-HOSC test w/ JAXA 05/2012**
    - **Testing the upgraded MSFC SCD 4 with software 7.0F**



# Issues and Concerns

---

- **MSFC SCDs**
  - **A 19 seconds delay in transmission of commands was discovered during testing with MSFC (BCC-HOSC)**
    - **This was due to a buffering problem in the MSFC SCD software**
  - **GSFC CSO/NISN delivered a new SCD to MSFC (on 05/07/12) with upgraded 7.0F software to mitigate the command delay from 19 seconds to 2 seconds**
  - **Back-up plan**
    - **If the updated SCD software does not mitigate the command delay, MSFC will configure the older SCDs (with AVTEC boards)**



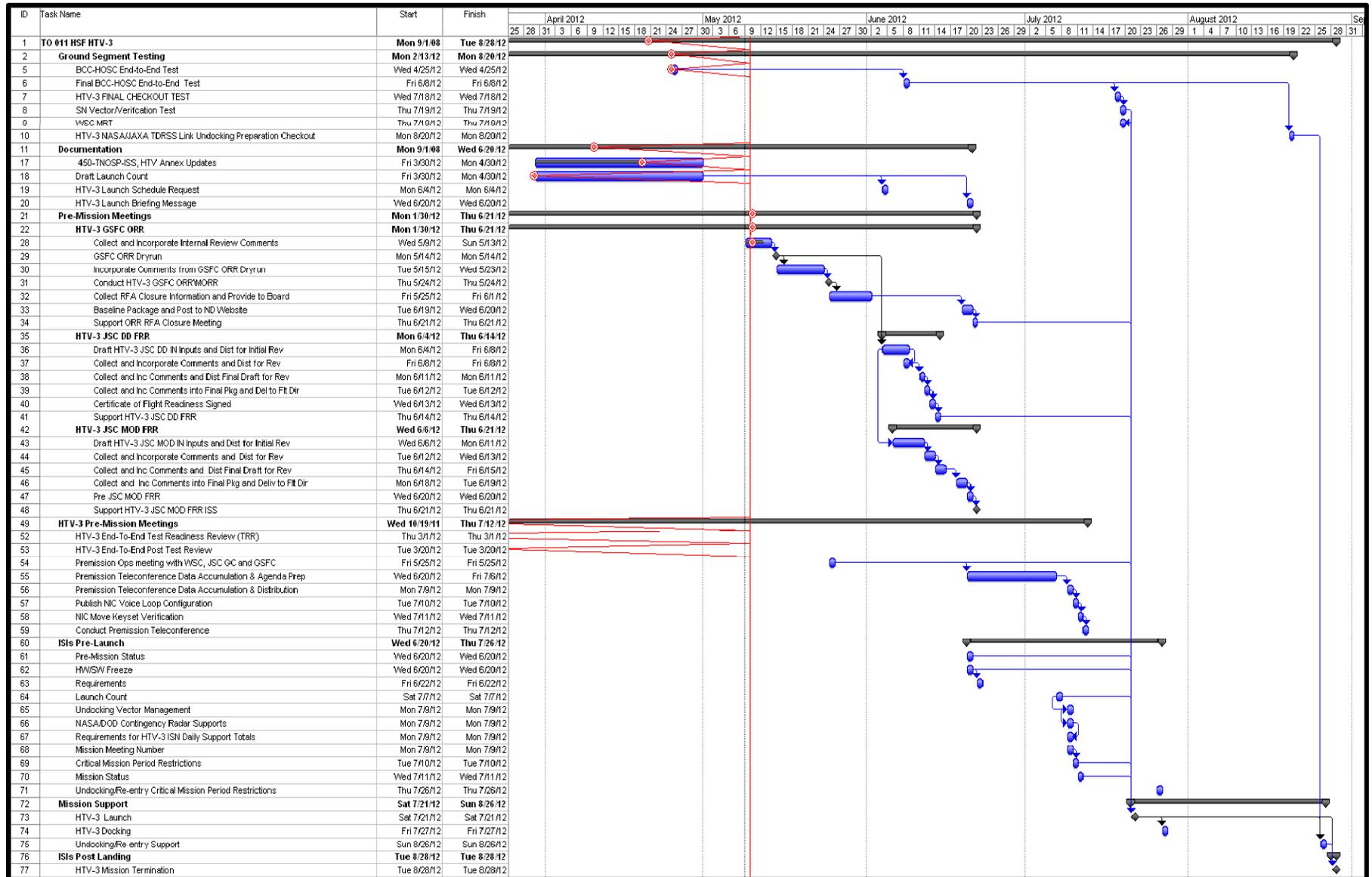
# Summary

---

- **The IN is ready to support the HTV-3 mission**



# Remaining Mission Activities





---

# Backup

---





# Launch Hold Criteria Definitions

Requirement Level	Definition	Launch Hold Impact	SCaN Implementation Response
<b>Mandatory</b>	<b>The service is mission critical and thus mandatory for Launch</b>	<b>A Launch hold <u>cannot</u> be waived for failure of a <b>MANDATORY</b> service</b>	<b>Two independent diverse system paths, the second as a hot backup capability, tested and ready for immediate service</b>
<b>Required</b>	<b>The service could significantly affect the mission and thus required for Launch</b>	<b>A Launch hold <u>can</u> be waived for failure of a <b>REQUIRED</b> service, if all conditions are optimal</b>	<b>Two independent diverse system paths, the second as a cold backup capability, tested and available for service once switched on</b>
<b>Desired</b>	<b>The service is desired, but is not required for Launch</b>	<b>A Launch hold will <u>not</u> be imposed for failure of a <b>DESIRED</b> service</b>	<b>Assets will be supplied on an as-available basis. No additional backup resources will be provided</b>



# Review Process

---

- **GSFC MORR** **05/24/12**
- **JSC DD Flight Readiness Review (FRR)** **06/14/12**
- **JSC MOD FRR** **06/21/12**



# Networks Integration Customer Satisfaction Survey

Please take a moment to let us know how well we, the Networks Integration Management Office (NIMO)/ Code 450.1 have met your networks integration expectations. We welcome your input on how we can improve our services. Thank you!

Mission Name \_\_\_\_\_ Your Name (optional) \_\_\_\_\_ Project Role/Title (optional) \_\_\_\_\_

How well has the Space and Ground Communications Networks organization...	VERY SATISFIED	SOMEWHAT SATISFIED	NEITHER SATISFIED NOR DISSATISFIED	SOMEWHAT DISSATISFIED	VERY DISSATISFIED	NOT APPLICABLE/ UNABLE TO ANSWER
1. Provided you with the information you needed to use our services?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Provided technical support to your mission?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Provided services in a timely manner?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Met your mission objectives and requirements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Provided a good value for our services?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Would you recommend our services to another project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Overall, how would you rate your satisfaction with our customer service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please use the space below to provide comments. Please provide details relating to your experience with networks integration, so that we may improve our services.

[Enter comments here]

Would you like to discuss your responses with someone independent of networks integration?

Yes  No

If "yes", please let us know how to contact you. Be sure you have provided your name (above the table).

Phone: \_\_\_\_\_ Email: \_\_\_\_\_



---

# CoFR Signature Sheet

---



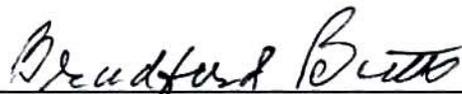
*Exploration and Space Communications  
Projects Division*



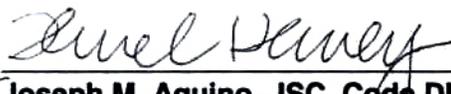
***Certificate of Flight Projects Directorate Networks Readiness***

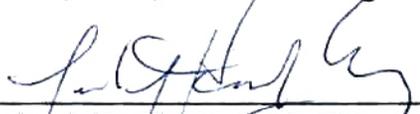
*This is to certify that with successful completion of flight readiness preparations and closure of associated action items, all integrated network elements are ready to support the HTV-3 Mission*

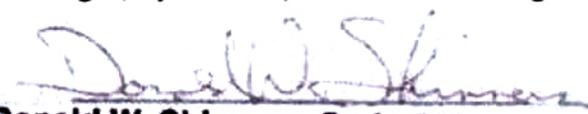
 5/24/2012  
 Carolyn P. Dent, Chairperson Date  
 Code 301, GSFC, Systems Review Office

 5/24/12  
 Bradford Butts, Code 761 Date  
 GSFC, Systems Management Branch

 05/24/12  
 Scott A. Greatorex, Code 450.1 Date  
 GSFC, Chief, Networks Integration Management Office

*for*  5/24/12  
 Joseph M. Aquino, JSC, Code DD13 Date  
 Manager, Space Communications Integration Office

 5/24/2012  
 John J. Hudiburg, Code 599 Date  
 GSFC, 450 Senior Technical Authority

 5/24/2012  
 Donald W. Shinnars, Code 452 Date  
 GSFC, Space Network Project

 5/24/2012  
 Susan L. Hoge, Code 595 Date  
 GSFC, Navigation and Mission Design Branch

 5/24/12  
 James A. Bangarter, Code 450.1 Date  
 GSFC, Human Spaceflight Network Director



---

# Acronym List

---



# Acronym List

---

<b>ACS</b>	<b>Assembly Contingency Subsystem</b>	<b>GC</b>	<b>Ground Control</b>
<b>AI</b>	<b>Action Item</b>	<b>GCMR</b>	<b>Ground Configuration Message Requests</b>
<b>ATV</b>	<b>Automated Transfer Vehicle</b>	<b>GN</b>	<b>Ground Network</b>
<b>BER</b>	<b>Bit Error Rate</b>	<b>GSFC</b>	<b>Goddard Space Flight Center</b>
<b>BCC</b>	<b>Back-up Control Center</b>	<b>HOSC</b>	<b>Goddard Space Flight Center</b>
<b>CDP</b>	<b>Command Data Processor</b>	<b>HSF</b>	<b>Human Space Flight</b>
<b>CMFP</b>	<b>Configuration Management Freeze Policy</b>	<b>HTV</b>	<b>H-II Transfer Vehicle</b>
<b>CoFR</b>	<b>Certificate of Flight Readiness</b>	<b>HVAC</b>	<b>Heating, Ventilating, and Air Conditioning</b>
<b>COTS</b>	<b>Commercial Orbit Transportation System</b>	<b>ICD</b>	<b>Interface Control Document</b>
<b>CSO</b>	<b>Communications Service Office</b>	<b>IN</b>	<b>Integrated Network</b>
<b>CTL</b>	<b>Compatibility Test Laboratory</b>	<b>IOS</b>	<b>Inter-Orbit System</b>
<b>DIS</b>	<b>Data Interface System</b>	<b>ISI</b>	<b>Interim Support Instruction</b>
<b>DOD</b>	<b>Department of Defense</b>	<b>ISS</b>	<b>International Space Station</b>
<b>DOY</b>	<b>Day of Year</b>	<b>JAXA</b>	<b>Japan Aerospace Exploration Agency</b>
<b>DSMC</b>	<b>Data Services Management Center</b>	<b>JSC</b>	<b>Johnson Space Center</b>
<b>ELV</b>	<b>Expendable Launch Vehicle</b>	<b>LEOP</b>	<b>Launch and Early Orbit Phase</b>
<b>ER</b>	<b>Eastern Range</b>	<b>MA</b>	<b>Multiple Access</b>
<b>ESA</b>	<b>European Space Agency</b>	<b>MAF, R</b>	<b>Multiple Access Forward, Return</b>
<b>EVA</b>	<b>Extravehicular Activity</b>	<b>MCC</b>	<b>Mission Control Center</b>
<b>FDF</b>	<b>Flight Dynamics Facility</b>	<b>MCM</b>	<b>Mission Communications Manager</b>
<b>FER</b>	<b>Freeze Exemption Requests</b>	<b>MELCO</b>	<b>Mitsubishi Electric Corporation</b>
<b>FEU</b>	<b>Flight Equivalent Unit</b>	<b>MMA</b>	<b>Mission Management Area</b>
<b>FRR</b>	<b>Flight Readiness Review</b>	<b>MORR</b>	<b>Mission Operations Readiness Review</b>

---



# Acronym List (cont'd)

---

<b>MOVE</b>	<b>Mission Operations Voice Enhancement</b>	<b>SMA</b>	<b>S-band Multiple Access</b>
<b>MRT</b>	<b>Mission Readiness Test</b>	<b>SMAF, R</b>	<b>S-band Multiple Access Forward, Return</b>
<b>MSFC</b>	<b>Marshall Space Flight Center</b>	<b>SMM</b>	<b>Spaceflight Mission Manager</b>
<b>N/A</b>	<b>Not Applicable</b>	<b>SN</b>	<b>Space Network</b>
<b>NASA</b>	<b>National Aeronautics and Space Administration</b>	<b>SSA</b>	<b>S-band Single Access</b>
<b>NASDA</b>	<b>National Space Development Agency</b>	<b>SSAF, R</b>	<b>S-band Single Access Forward, Return</b>
<b>NCCDS</b>	<b>Network Control Center Data System</b>	<b>SSCC</b>	<b>Space Station Control Center</b>
<b>ND</b>	<b>Network Director</b>	<b>STGT</b>	<b>Second TDRSS Ground Terminal</b>
<b>NIC</b>	<b>Network Integration Center</b>	<b>TBD</b>	<b>To Be Determined</b>
<b>NIMO</b>	<b>Networks Integration Management Office</b>	<b>TDE</b>	<b>TDRS East</b>
<b>NITSM</b>	<b>NICS Information Technology Service Management</b>	<b>TDRS</b>	<b>Tracking and Data Relay Satellite</b>
<b>NM</b>	<b>Network Manager</b>	<b>TDRSS</b>	<b>Tracking and Data Relay Satellite System</b>
<b>PFM</b>	<b>Proto-Flight Model</b>	<b>TDS</b>	<b>TDRS Spare</b>
<b>POC</b>	<b>Point of Contact</b>	<b>TDW</b>	<b>TDRS West</b>
<b>POIC</b>	<b>Payload Operations Integration Center</b>	<b>TDZ</b>	<b>TDRS ZOE</b>
<b>PMR</b>	<b>Post-Mission Review</b>	<b>TnSC</b>	<b>Tanegashima Space Center</b>
<b>PRD</b>	<b>Program Requirements Document</b>	<b>TO&amp;A</b>	<b>Technical Operations and Analysis</b>
<b>PSM</b>	<b>Program Support Manager</b>	<b>TRM</b>	<b>TDRSS Real Time Manager</b>
<b>RF</b>	<b>Radio Frequency</b>	<b>TRR</b>	<b>Test Readiness Review</b>
<b>RFA</b>	<b>Requests for Action</b>	<b>TT&amp;C</b>	<b>Tracking Telemetry and Control</b>
<b>RFICD</b>	<b>Radio Frequency Interface Control Document</b>	<b>UPD</b>	<b>User Performance Data</b>
<b>SA</b>	<b>Single Access</b>	<b>UPS</b>	<b>Uninterruptible Power Supply</b>
<b>SDTO</b>	<b>Station Development Test Objective</b>	<b>USS</b>	<b>User Subsystem</b>

---



# Acronym List (cont'd)

---

<b>VHF</b>	<b>Very High Frequency</b>
<b>VV</b>	<b>Visiting Vehicle</b>
<b>WSC</b>	<b>White Sands Complex</b>
<b>WSGT</b>	<b>White Sands Ground Terminal</b>
<b>Z</b>	<b>Zulu</b>
<b>ZOE</b>	<b>Zone of Exclusion</b>