



Automated Transfer Vehicle-3 (ATV) Mission Operations Readiness Review (MORR)

January 05, 2012
BASELINE 01/19/12

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



Agenda

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Review Board

- **Carolyn P. Dent, Chairperson, GSFC, Code 301, Systems Review Office**
- **John J. Hudiburg, GSFC, Code 599, 450 Senior Technical Authority**
- **Scott A. Greatorex, GSFC, Code 450.1, Chief, Networks Integration Management Office**
- **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. Shinnars, GSFC, Code 452, Space Network Project**
- **James A. Bangerter, GSFC, Code 450.1, Human Spaceflight Network Director**



Purpose of the Mission Operations Readiness Review

- **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**



ATV-3 Mission Overview

T. Russell



Project/Mission Summary

- **The objective of this mission is as follows:**
 - **ATV-3 is an unmanned resupply spacecraft developed by the European Space Agency (ESA) to deliver equipment, spare parts, and consumables to the International Space Station (ISS)**



Mission Summary

- **Launch Date** **March 09, 2012**
 - **Day Of Year (DOY)/Window** **069/0951-1013Z**
 - **T-0** **069/1000Z**
 - **Backup Launch Window** **1 Launch attempt per day for 2 days with a stand down on the 3rd day to replenish the Liquid Oxygen (LOX) tanks**
 - **Launch Vehicle/Site** **Ariane 5 / Kourou, French Guiana**
 - **Primary Payload** **Supplies (8 tons)**
 - **Inclination** **51.6 degrees**
 - **Docking** **March 19, 2012**
 - **Undocking** **August 27, 2012**
 - **Re-entry** **August 29, 2012**
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ISS Supply Sequence

Date	Flight	Launch Vehicle/Elements
10/30/11	45P Russian Progress	Logistics and Re-supply
11/14/11	28S Russian Soyuz (Expedition 29)	Crew Transport, Logistics, and Re-supply
11/22/11	27S Russian Soyuz (Undock)	Un-dock & Return To Earth
12/21/11	29S Russian Soyuz (Expedition 30)	Crew Transport, Logistics, and Re-supply
01/26/12	46P Russian Progress	Logistics and Re-supply
02/07/12	Falcon 9 Dragon Demo 2	Demonstrate rendezvous and berthing with the International Space Station
03/09/12	ATV 3	Logistics and Re-supply
03/30/12	30S Russian Soyuz (Expedition 31)	Crew Transport, Logistics, and Re-supply
04/25/12	47P Russian Progress	Logistics and Re-supply
04/28/12	Antares Cygnus 1 Demo 1	Antares rocket will launch a simulated Cygnus spacecraft on a demonstration flight to the International Space Station (ISS)
05/30/12	31S Russian Soyuz (Expedition 32)	Crew Transport, Logistics, and Re-supply
06/26/12	HTV 3	Logistics and Re-supply
07/25/12	48P Russian Progress	Logistics and Re-supply
09/26/12	32S Russian Soyuz (Expedition 33)	Crew Transport, Logistics, and Re-supply

Red Date = Launch Planned

Gray Date = Completed Missions



IN Requirements

T. Russell



IN Requirements

- **ER**

DBR ID	Requirements
<ul style="list-style-type: none">• 556069	<ul style="list-style-type: none">• C-BAND RADAR SUPPORT<ul style="list-style-type: none">○ NASA and DOD C-band radar will support as required ISS free flyer Visiting Vehicles. Support is currently estimated at approximately 5 passes per mission for ISS Visiting Vehicles➤ <i>Note: DBR is being updated to reflect C-Band radar as contingency only</i>

- **CSO**

DBR ID	Requirements
<ul style="list-style-type: none">• 553526	<ul style="list-style-type: none">• ATV S-BAND RETURN FROM WSC TO SSCC (Space Station Control Center)<ul style="list-style-type: none">○ The ATV S-band Single Access Return (SSAR) link data rate shall operate at 64 or 8 kbps. The ATV S-band Multiple Access (MA) Return link data rate operates at 8 kbps. The ATV S-band system can be operated coherently or non-coherently. ATV requirement for TDRSS coherent mode operation is the ATV tracking purposes only
<ul style="list-style-type: none">• 553540	<ul style="list-style-type: none">• ATV S-BAND FORWARD SUPPORT FROM SSCC TO WSC<ul style="list-style-type: none">○ The ISS S-band Single Access Forward (SSAF) link and/or S-band MA Forward (MAF) links originate at the SSCC and shall be transported to the WSC. The ATV SSAF link operates at 1 kbps. The ATV S-band forward link data rate operates at 1 kbps in MA
<ul style="list-style-type: none">• 556504	<ul style="list-style-type: none">• DSMC INTERFACE<ul style="list-style-type: none">○ Communications interfaces between the SSCC, the HOSC and the NIC shall be provided

NOTE: Failed requirements are marked in red text



IN Requirements (cont'd)

- **FDF**

DBR ID	Requirements
<ul style="list-style-type: none">• 533540	<ul style="list-style-type: none">• TDRS STATE VECTORS<ul style="list-style-type: none">○ When required, the GSFC FDF shall provide the SSCC and 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 H-II Transfer Vehicle (HTV) support will be supplied by the SSCC to the ESA and 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 ICD for Mission Control Center (MCC) Systems (JSC 11534, Vol. 1, latest revision). Vectors will be transmitted between FDF and SSCC via ISSOnet
<ul style="list-style-type: none">• 533541	<ul style="list-style-type: none">• ISS TRANSMITTED FREQUENCY MEASUREMENT<ul style="list-style-type: none">○ 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○ 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, ATVCC, and HTVCC for use in estimating the required frequency information in the TDRSS scheduling and ground control messages

NOTE: Failed requirements are marked in red text



IN Requirements (cont'd)

- **FDF (cont'd)**

DBR ID	Requirements
• 534319	<ul style="list-style-type: none">• OPERATIONAL CONCEPTS – GENERAL<ul style="list-style-type: none">○ 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, and HTV 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 Launch Vehicles (ELV). Additional support is provided for TDRSS performance assessment for the STDN/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
• 551187	<ul style="list-style-type: none">• ISS STATE VECTORS<ul style="list-style-type: none">○ 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

NOTE: Failed requirements are marked in red text



IN Requirements (cont'd)

- **SN**

DBR ID	Requirements
<ul style="list-style-type: none">• 533532	<ul style="list-style-type: none">• TRACKING AND DATA RELAY SATELLITE SYSTEM<ul style="list-style-type: none">○ 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, ATV S-band system, HTV S-band system, and commercial entities vying for the 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, EVA, VV Launch, and other critical activities○ The ATV S-band system operates in MA/SMA at 8 kbps return link and 1 kbps forward link. The ATV S-band system operates in S-band Single Access (SSA) at 8 or 64 kbps return link and 1 kbps forward link. The ATV shall require continuous TDRSS forward and return link, including the Zone of Exclusion (ZOE) during critical phases of flight. In addition, ATV will utilize TDRSS covering the attached phase periodically and will share TDRSS time with ISS
<ul style="list-style-type: none">• 533542	<ul style="list-style-type: none">• WSC RECORDING INTERVAL<ul style="list-style-type: none">○ 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>

NOTE: Failed requirements are marked in red text



IN Requirements (cont'd)

- **NIC**

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

NOTE: Failed requirements are marked in red text

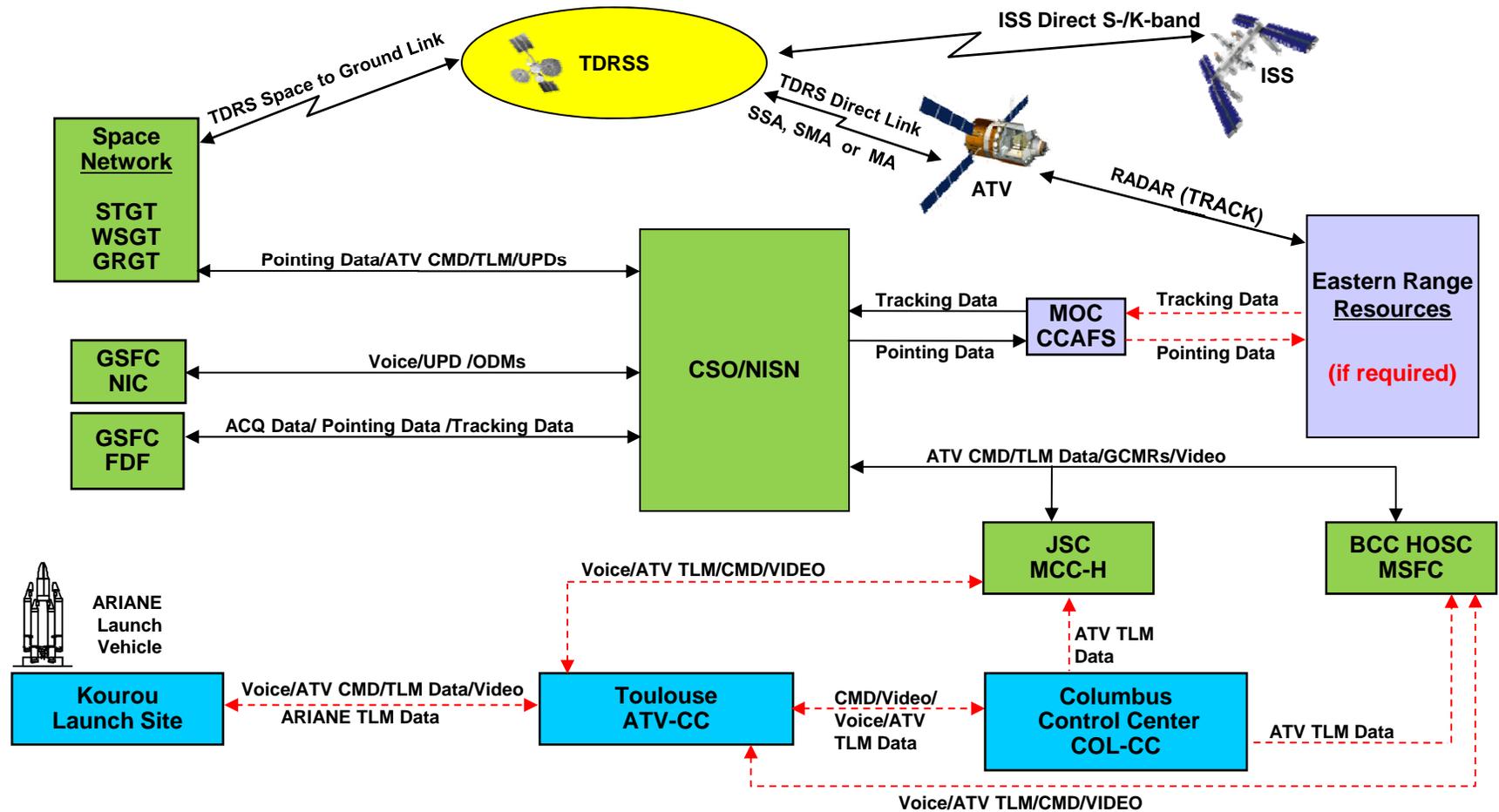


Launch Hold Criteria

Requirement	Interval
Mandatory	<i>TDRS support</i>
Required	➤ <i>N/A</i>
ATV-ISS Joint Flight Rules	<i>Flight Rule (E2-1) states that TDRS support is required as part of the launch criteria for ATV</i>



Networks Configuration





Documentation

Document Title	Document Number/Version	Effective Date	Future Issue Date
Automated Transfer Vehicle (ATV) Annex to the TNO SP for the International Space Station (ISS)	450-TNO SP-ISS, ATV Annex	06/2007	06/2012
ISS Network Program Requirements Document (NPRD)	Rev K	10/2008	Rev L in Review
ISS Program Requirements Document (PRD)	Volume I	Active Database	
Radio Frequency Interface Control Document (RFICD) between ATV and TDRSS	Original DCN 002	06/2004 04/08/11	
ATV-ISS Joint Flight Rules	NSTS-12820 Vol E, Final, Rev A, PCN-2	03/2010 03/16/11	
ATV Transponder/TDRSS Compatibility Test Plan	451-PLAN-ATV/ISS/TDRS, Original	07/2004 DCN 001 In-Process	01/06/12
Launch Schedule Request			
ISI 001 – Pre-Mission Status		L-30	
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 Contingency Support		L-7	
ISI 008 – 64 kb SMA Engineering Passes		L-7	
ISI 009 – SSA Contingency Support		L-7	
ISI 010 – Mission Termination		Upon release from JSC	
Waiver for Compatibility testing			01/05/12
Lessons Learned Review		TBD	
Post-Mission Report	ATV-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):**
 - **ATV command support (1 kbps; 2 ksps) may be requested for S-band Single Access (SSA) or Multiple Access (MA)**
 - **All forward link margins are positive**
- **Return Services through the SN (nominal frequency of 2287.5 MHz):**
 - **ATV real-time telemetry support (8 kbps; 16 ksps) may be requested for SSA or MA**
 - **ATV telemetry dump support (64 kbps; 128 ksps) may be requested for SSA**
 - **All return service margins are positive**



RF Analysis Summary (cont'd)

- **Note: There is a risk to SN support of ATV during periods when the ephemeris uncertainty exceeds ± 9 seconds until a more accurate set of ATV vectors are received at White Sands Complex (WSC)**
 - The forward link is expected to exceed the ATV transponder capabilities
 - The non-coherent return link is expected to be within the SN ground terminal capabilities
 - The coherent return link is not expected to be within the SN ground terminal capabilities
 - Analysis has been documented as Appendix C to the ATV RFICD
- **RFICD is under configuration control**



RF Analysis Summary (cont'd)

Mode	Link	Information Rate (kbps) (note 1)	Modulation	ATV Antenna	ATV G/T or EIRP	ATV-to-TDRS Elevation Angle (degrees)	RF Margin (dB) (BER=10 ⁻⁵) (note 2)
MA	FWD	1	SS-UQPSK	-Z	-28.7 dB/K	35.16	3.5
	RTN	8	SQPN	-Z	12.1 dBW	35.16	2.3
SSA	FWD	1	SS-UQPSK	-Z	-28.7 dB/K	35.16	13.1
	FWD	1	SS-UQPSK	+Z	-30.8 dB/K	0	10.1
	RTN	8	SQPN	-Z	12.1 dBW	35.16	10.8
	RTN	8	SQPN	-Z	12.1 dBW	46.25	10.5
	RTN	8	SQPN	+Z	10.3 dBW	0	8.4
	RTN	64	SQPN	-Z	12.1 dBW	35.16	1.8
	RTN	64	SQPN	-Z	12.1 dBW	46.25	1.5

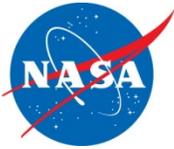
Notes

1. The ATV forward link information data rate is 1 kbps and is rate ½ coded to 2 kbps by ESA prior to receipt by WSC
2. Link margins calculated at a free space range values to TDRS based upon the ATV-to TDRS elevation angle and an ATV minimum altitude of 230 km after separation. The elevation angle of 35.16 degrees is the minimum angle from ATV-to-TDRS for an ATV antenna theta angle of <70° for the -Z (i.e., Zenith pointed) antennas. The theta angle is the angle between the TDRS and the ATV axis that the ATV antenna is mounted on. The worst-case SSA return link budget exists for an ATV-to-TDRS elevation angle of 46.25 degrees. For the +Z (i.e., Nadir pointed) antenna, which is used for emergency operations, a minimum ATV-to-TDRS elevation angle of 0 degrees was assumed



Networks Feasibility Analysis

C. Schwartz



Networks Feasibility Analysis Summary

- **SN Nominal Operations Periods:**
 - Analysis of ATV-3 requirement of one 20-minute SSA event per orbit from any available Tracking and Data Relay Satellite (TDRS) indicates no impacts to other customer commitments expected as long as the launch window does not exceed 30 minutes in duration
 - Analysis of ATV-3 SN MA or enhanced MA (S-band Multiple Access (SMA)) requirement for near-continuous coverage shows no impacts to other customer commitments (SMA only available on F10 supported by Space Ground Link Terminal (SGLT)2 once F10 is operational at TDW; with F9 at TDE supported by SGLT3)
- **SN Peak Loading Periods:**
 - ATV-3 launch on same day as COTS SpaceX Demo-2/3, Delta IV (NROL-25 PL), Atlas V (MUOS-1 PL) or NuSTAR would present WSC scheduling issues but impacts to other customer commitments (caused solely by ATV-3) would be in the same range as experienced for any other normal Expendable Launch Vehicle (ELV) or Launch and Early Orbit Phase (LEOP) post-launch period as long as ATV-3 SSA support is provided from any of TDS, T171 or T275
 - Analysis of ATV-3 SN MA/SMA requirement for near-continuous coverage shows no impacts to other customer commitments (with SMA only available on F10)



RF Compatibility Testing Results

S. Leslie



RF Compatibility Testing Results

- **The ATV Category-II RF compatibility test was conducted at the European Aeronautic Defense and Space Company (EADS) Space Transportation (ST) facility in Bremen, Germany, (CTL) from May 17-21, 2004**
- **There has been no additional Compat Testing since ATV-1**



Networks Requirements Verification Results

T. Russell



Networks Requirements Verification Summary

- **Testing Summary**

- **System Validation Test Slot -1 (SVT-1) Antenna Pointing test 07/07/11. All objectives met**
- **SVT-1 test 07/12/11. All objectives met**
- **Backup Control Center – Huntsville Operations Support Center (BCC-HOSC) Swing test 11/15/11. All objectives met**
- **SVT-2 Antenna Pointing test 12/12/11. All objectives met**
- **SVT-2 Readiness test 12/14/11. All objectives met**
- **SVT-2 test 12/15/11. All objectives met**
- **BCC-HOSC Retest 12/21/11. Commanding through the HOSC objective not met. Retest date is To Be Determined (TBD)**

Pending Test Efforts	Test Date
WSC Mission Readiness Test (MRT)	L-3 (approx.)
FDF Vector Verification Tests	L-7 (approx.)
L-4 checkout	L-4
BCC-HOSC retest	TBD



ATV-3 Test Matrix

ATV-3 Networks Service Requirements Test Matrix Green - Successfully Completed Green A - Done by Analysis Yellow - Partially Successful Red - Failed Black - Not Applicable White - To Be Tested		SVT1 Antenna Pointing Test (07/07/11)	SVT1 System Validation Test Slot 1 (07/12/11)	ATV-3 BCC-HOSC (11/15/11)	SVT2 Antenna Pointing Test (12/12/11)	SVT2 Readiness Test (12/14/11)	SVT2 System Validation Test Slot 2 (12/15-16/11)	BCC-HOSC Retest (12/21/11)	BCC-HOSC Retest (TBD)	Vector Verification (Approx. L-7 days)	WSC MRT (Approx. L-3 days)	L-4 checkout (L-4 days)	Verified by Analysis	Current Status
		Eastern Range (ER) Requirements												
DBR # 556069	C-BAND RADAR SUPPORT													
Flight Dynamics Facility (FDF) Requirements														
DBR # 533540	TDRS STATE VECTORS													
DBR # 533541	ISS TRANSMITTED FREQUENCY MEASUREMENT													
DBR # 534319	OPERATIONAL CONCEPTS – GENERAL													
DBR # 551187	ISS STATE VECTORS													
Communications Service Office (CSO) Requirements														
DBR # 553526	ATV S-BAND RETURN FROM WSC TO SSCC (Space Station Control Center)													
DBR # 553540	ATV S-BAND FORWARD SUPPORT FROM SSCC TO WSC													
DBR # 556504	DSMC INTERFACE													



ATV-3 Test Matrix (cont'd)

ATV-3 Networks Service Requirements Test Matrix Green - Successfully Completed Green A - Done by Analysis Yellow - Partially Successful Red - Failed Black - Not Applicable White - To Be Tested		SVT1 Antenna Pointing Test (07/07/11)	SVT1 System Validation Test Slot 1 (07/12/11)	ATV-3 BCC-HOSC (11/15/11)	SVT2 Antenna Pointing Test (12/12/11)	SVT2 Readiness Test (12/14/11)	SVT2 System Validation Test Slot 2 (12/15-16/11)	BCC-HOSC Retest (12/21/11)	BCC-HOSC Retest (TBD)	Vector Verification (Approx. L-7 days)	WSC MRT (Approx. L-3 days)	L-4 checkout (L-4 days)	Verified by Analysis	Current Status
		Space Network (SN) Requirements												
DBR # 533532	TRACKING AND DATA RELAY SATELLITE SYSTEM	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
DBR # 533542	WSC RECORDING INTERVAL	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Network Integration Center (NIC)														
DBR # 533534	SYSTEM VERIFICATION	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green



Launch Activities

T. Russell

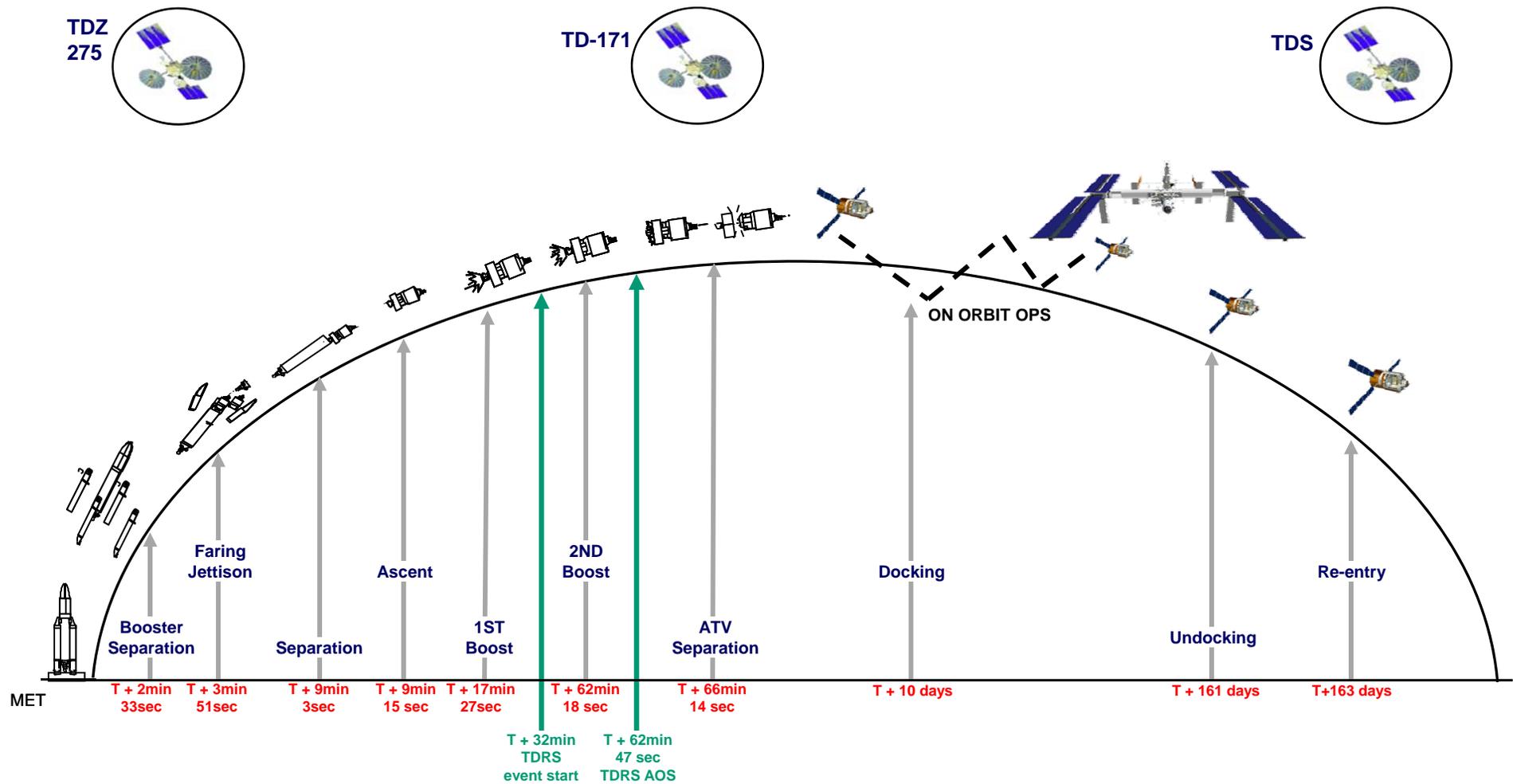


Launch Day Sequence of Events (Launch Count)

- **Spaceflight Mission Manager (SMM) on console time L-08:30:00 – until released**
 - **L – 08:00:00** **Request Voice Controller to establish voice circuits**
 - **L – 07:00:00** **Conduct a Launch briefing with FDF and WSC on TDRS-3**
 - **L – 06:55:00** **Tape Playback from WSC
Command Check (MAF event utilized)**
 - **L – 05:55:00** **Tape Playback from WSC
Command Check (MAF event utilized)**
 - **L – 01:00:00** **Ground Configuration Message Request (GCMR)
verification checkout with Johnson Space Center (JSC) and
WSC**
 - **L – 00:50:00** **Tape Playback from WSC
Command Check (MAF event utilized)**
 - **T + 0** **Liftoff**
 - **T + 00:32:00** **Start of TDRS Service**



IN Timeline Summary



LPAs
 TLM: 0236
 CMD: 0405 (JSC)
 0112 (MSFC)
 CMD ECHO: 0238

Mission data rates
 CMD: 1 kbps
 TLM: 8kbps/64kbps



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

- **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, 450-CMFP-HSF/ELV**



Networks Status



ER Operations

M. Gawel



C-band Radar Contingency

- **ISS Visiting Vehicles (VV) are not routinely supported by the Department of Defense (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**
- **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 Interim Support Instruction (ISI)**
- **ER will provide radar status prior to the mission to the Human Spaceflight Network Director (HSF ND) and SMM**



C-band Radar Contingency (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**



SN Operations

E. Richards



SN Operations

- **SN configuration changes since the last VV mission (Soyuz 29 12/21/11)**

Type	System	Significant Changes
Software	Data Interface System (DIS)	• Obsolescence Driven Avionics Redesign (ODAR) Software Delivery 001 – White Sands Ground Terminal (WSGT) 12/08/11 and Second TDRSS Ground Terminal (STGT) 12/15/11
Hardware	None	• None

- **Open DR: None**



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 ATV-3 mission**



FDF Operations

W. Mitchell



FDF Operations

- **FDF configuration changes since the last VV mission (Soyuz 29 12/21/11)**

Type	System	Significant Changes
Software	New modernized FDF Software system*	• New communication front end with new external interfaces
Hardware	New modernized FDF Hardware system*	• New communication front end with new external interfaces

* Note - Modernized software and hardware were used operationally for the Soyuz-29 mission

- **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 ATV-3 mission**



CSO Operations

R. Honeycutt



CSO Operations

- CSO Operations

Voice	Participants
IP/GC-1	JSC, NIC, WSC, MSFC
ISS TN Coord	JSC, NIC, FDF, WSC, MSFC
Lead Range Coord	If applicable
Track Coord	If applicable
GC/NOM Coord	JSC, NIC
Data	Participants
SSA/MA Telemetry: 8 kbps / 64 kbps	WSC, JSC, MSFC HOSC BCC and NIC
SSA/MA Command and Command Echo 1 kbps	JSC, WSC and NIC
SSA/MA Command Backup	MSFC HOSC BCC and NIC
2.4 kbps LTAS Data (ER/C-band)	for contingency only
Notes	



CSO Operations (cont'd)

- **CSO configuration changes since the last VV mission (Soyuz 29 12/21/11)**

Type	System	Significant Changes
Software	None	None
Hardware	Mission Operations Voice Enhancement (MOVE) Type "D" Keypad Retrofit	<ul style="list-style-type: none">• 414 Type D Keypads deployed at GSFC (379 installed with 35 spares)• 96 retrofitted keypads have been received and deployed to date• Goal is to get 40 keypads retrofitted/swapped per week• Expect to have all keypad retrofitted and deployed by early to mid February
	Nortel Router Project Upgrade	<ul style="list-style-type: none">• Current Network routers are obsolete and not supported by vendor• All equipment has been delivered to sites and in different stages of installation by Host Centers• No new routers have been connected to the operational Network and will not be until after TRR currently scheduled for 02/01/12• Project completion date scheduled for 05/30/12

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



CSO Operations (cont'd)

- **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 ATV-3 mission**



NIC Operations

E. Mount



NIC Operations

- **NIC configuration changes since the last VV mission (Soyuz 29 12/21/11)**

Type	System	Significant Changes
Software	Note*	None
Hardware	Note*	None

* Note - NIC Shuttle Specific Hardware/Software removal is in progress. Systems affected are as follows:

- Shuttle Antenna Monitoring System (SAMS)
- Remote Control Interface System (RCI)
- Air to Ground System
- Shuttle Command Frequency Counter

Equipment removal is of no impact to current NIC Operations

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



NIC Operations (cont'd)

- FERs**

Item	Status	Comments
GSFC Building 35 Construction	Approved through 02/29/12	Construction of new Logistics Facility. Separate FER's will be submitted when efforts involve critical zones 1, 2, and/or 3
GSFC Steam Restoration Project	Approved through 01/31/12	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

- Facilities Overview**

Item	Status	Comments
Commercial Power	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 hour 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 ATV-3 mission**



Points of Contact (POC)

Position	Name(s)	Location	Launch Service	Contact Information
Network Director (ND)	Jim Bangerter	GSFC	L-4:00 hrs	(C) 301-286-1819 (O) 301-286-7306; james.a.bangerter@nasa.gov
Network Manager (NM)	Melissa Blizzard	GSFC	L-4:00 hrs	(C) 301-286-1820 (O) 301-823-2622; melissa.blizzard@exelisinc.com
Mission Ground Control (GC)	Charles Wilson	JSC	L-8:00 hrs	(C) 281-244-5279 (O) 281-483-6877; charles.r.wilson@nasa.gov
Alt. GC	Brian Jones	JSC	L-8:00 hrs	(C) 281-244-5279 (O) 281-483-0555; brian.jones-1@nasa.gov
Lead Mission Spaceflight Mission Manager (SMM)	Tom Russell	GSFC	L-8:00 hrs	(C) 301-286-1824/1817 (O) 301-823-2626; thomas.russell@exelisinc.com
Alt. Mission SMM	Liz Clark	GSFC	L-8:00 hrs	(C) 301-286-1824/1817 (O) 301-823-2625; elizabeth.clark@exelisinc.com
Facility Operations Manager (FOM)	Eric Mount	GSFC	L-8:00 hrs	(O) 301 286-0601; eric.s.mount@nasa.gov
SN - WSC	Erik Richards	WSC	L-8:00 hrs	(C) 575-527-7157 (O) 575-527-7120; erik.richards@nasa.gov
FDf	Warren Mitchell	GSFC	L-8:00 hrs	(C) 301-286-8191 (O) 301-286-5092; warren.i.mitchell@nasa.gov
CSO	Randy Honeycutt	GSFC	L-8:00 hrs	(C) 301-286-6141 (O) 301-286-0771; randy.b.honeycutt@nasa.gov
ER	Michael Gawel	Cape Canaveral/KSC	N/A	(C) 321-853-8118 (O) 321-853-8326; michael.gawel@patrick.af.mil

O – Office C – Console



IN Summary

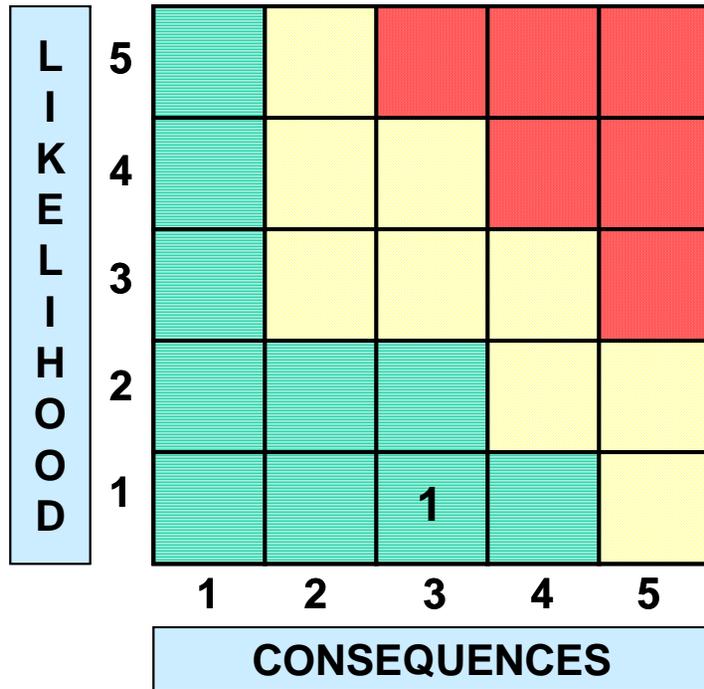
T. Russell



Risks and Issues



Risks



LxC Trend	Rank	Approach	Risk Title
1x3 ➡	1 Low	M	ATV ephemeris Uncertainty

Criticality	L x C Trend	Approach
High	⬇ Decreasing (Improving)	M – Mitigate
Med	⬆ Increasing (Worsening)	W – Watch
Low	➡ Unchanged	A – Accept
	* New since last mission	R – Research



Risks (cont'd)

ATV ephemeris uncertainty

Rank	Risk Statement	Approach & Plan	Comments
1	If ATV ephemeris uncertainty exceeds +/- 9sec, then antenna pointing and signal acquisition/tracking could not be obtained	Mitigate – Accept Risk <ul style="list-style-type: none">WSC can expand uncertainty range to sweep wider range if necessary	No further action is planned. ATV 1 and 2 were successfully supported by the SN under similar conditions

Risk Criticality   



Open Work

- **Standard Open Work**
 - BCC-HOSC retest
 - WSC MRT
 - FDF Vector Verification Tests
 - L-4 checkout
- **Non-Standard Open Work**
 - None



Issues and Concerns

- **None**

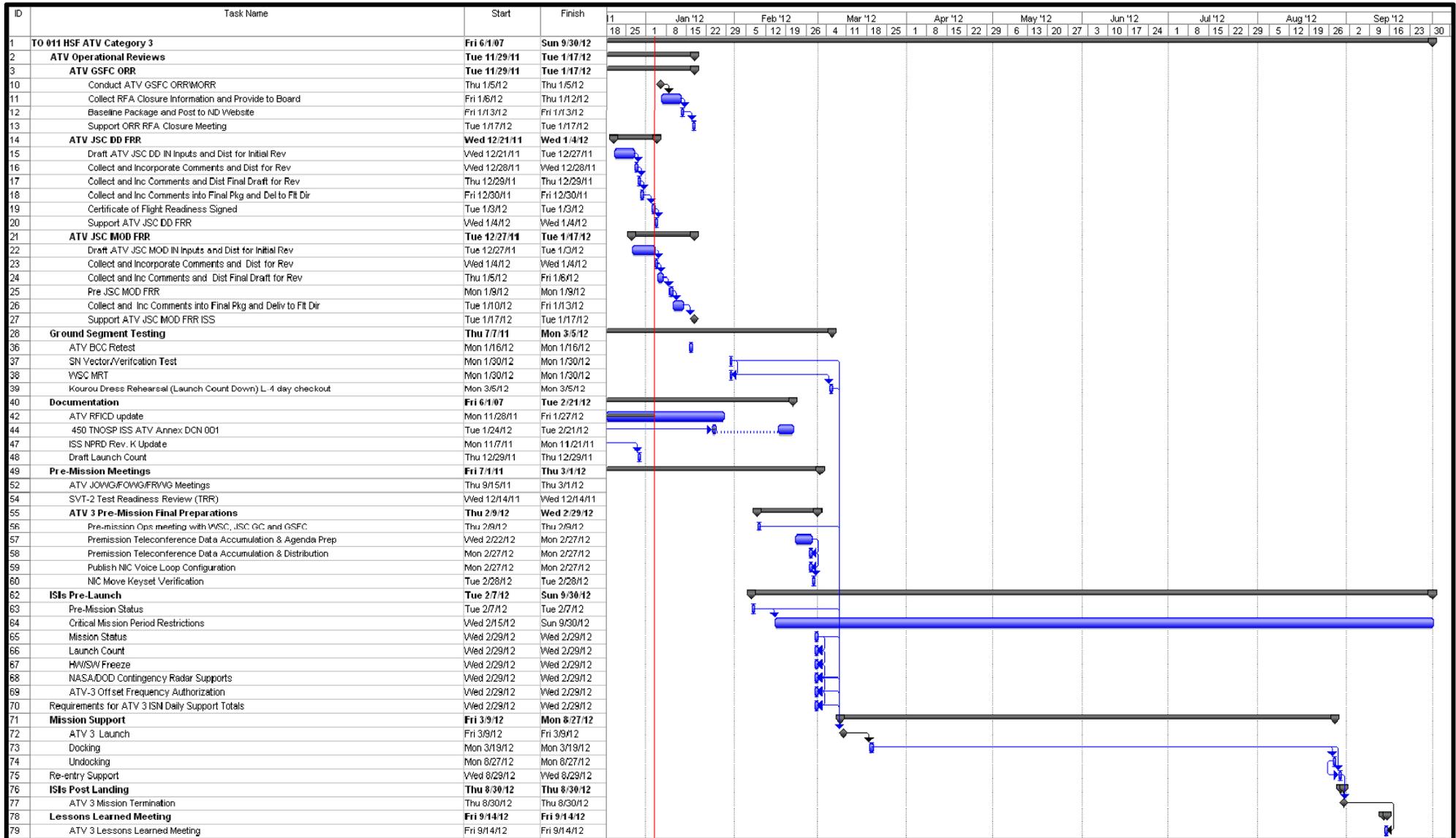


Summary

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



Remaining Mission Activities





Backup



Review Process

- **Goddard Space Flight Center (GSFC)
Mission Operations Readiness Review
(MORR)** **01/05/12**
- **JSC DD Flight Readiness Review (FRR)** **02/03/12**
- **JSC MOD Flight Readiness Review (FRR)** **02/10/12**



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
ATV-3 Mission*

Carolyn P. Dent 11/5/2012
 Carolyn P. Dent, Chairperson, Code 301, GSFC, Systems Review Office Date

Susan L. Hoge FOR: 1/5/12
 Susan L. Hoge, Code 595 Date
 GSFC, Navigation and Mission Design Branch

John J. Hudiburg 1/5/12
 John J. Hudiburg, Code 599 Date
 GSFC, 450 Senior Technical Authority

Bradford Butts 1/5/12
 Bradford Butts, Code 761 Date
 GSFC, Systems Management Branch

Scott A. Greatorex 01/05/12
 Scott A. Greatorex, Code 450.1 Date
 GSFC, Chief, Networks Integration Management Office

Joseph M. Aquino 1/5/12
 For Joseph M. Aquino, JSC, Code DD13 Date
 Manager
 Space Communications Integration Office



*Exploration and Space Communications
Projects Division*

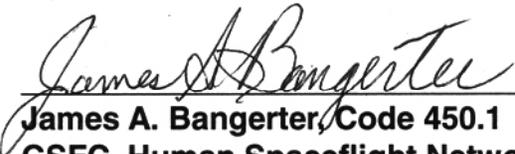


Certificate of Flight Projects Directorate Networks Readiness

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ATV-3 Mission*


Donald W. Shinnars, Code 452
GSFC, Space Network Project

01/05/12
Date


James A. Bangerter, Code 450.1
GSFC, Human Spaceflight Network Director

01/05/12
/ / Date



Acronym List



Acronym List

AI	Action Item	ISI	Interim Support Instruction
ATV	Automated Transfer Vehicle	ISS	International Space Station
BCC	Backup Control Center	JSC	Johnson Space Center
CMFP	Configuration Management Freeze Policy	LEOP	Launch and Early Orbit Phase
CSO	Communication Services Office	LOX	Liquid Oxygen
DIS	Data Interface System	MA	Multiple Access
DOD	Department of Defense	MAF, R	Multiple Access Forward, Return
DOY	Day Of Year	MORR	Mission Operations Readiness Review
EADS	European Aeronautic Defense and Space Company	MOVE	Mission Operations Voice Enhancement
ELV	Expendable Launch Vehicle	MRT	Mission Readiness Test
ER	Eastern Range	N/A	Not Applicable
ESA	European Space Agency	NASA	National Aeronautics and Space Administration
FDF	Flight Dynamics Facility	ND	Network Director
FER	Freeze Exemption Requests	NIC	Network Integration Center
FOM	Facility Operations Manager	NISN	NASA Integrated Services Network
FRR	Flight Readiness Review	NM	Network Manager
GC	Ground Control	NPRD	Network Program Requirements Document
GCMR	Ground Configuration Message Request	ODAR	Obsolescence Driven Avionics Redesign
GSFC	Goddard Space Flight Center	PMR	Post-Mission Review
HSF	Human Spaceflight	POC	Points of Contact
HOSC	Huntsville Operations Support Center	PRD	Program Requirements Document
HVAC	Heating, Ventilating, and Air Conditioning	RF	Radio Frequency
IN	Integrated Network	RFA	Requests for Action



Acronym List (cont'd)

RFICD	Radio Frequency Interface Control Document
SGLT	Space Ground Link Terminal
SMA	S-band Multiple Access
SMAF, R	S-band Multiple Access Forward, Return
SMM	Spaceflight Mission Manager
SN	Space Network
SSA	S-band Single Access
ST	Space Transportation
STGT	Second TDRSS Ground Terminal
SVT	System Validation Test
TBD	To Be Determined
TDE	TDRS East
TDRS	Tracking and Data Relay Satellite
TDRSS	Tracking and Data Relay Satellite System
TDS	TDRS Spare
TDW	TDRS West
TDZ	TDRS ZOE
UPS	Uninterruptible Power Supply
WSC	White Sands Complex
WSGT	White Sands Ground Terminal
Z	Zulu
ZOE	Zone of Exclusion