SUBJECT: ATV-3 MORR Minutes

DATE: January 5, 2012

PLACE: Goddard Space Flight Center, B8 Auditorium

TIME CONVENED: 1300 TIME ADJOURNED: 1345

ATTENDANCE

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INTRODUCTION

Mr. Jim Bangerter convened the Automated Transfer Vehicle (ATV)-3 Mission Operations Readiness Review (MORR) to review Integrated Network (IN) element mission operations readiness in support of the ATV-3 mission (refer to the presentation, *Automated Transfer Vehicle-3 [ATV] Mission Operations Readiness Review [MORR]*).

MEETING ITEMS

A. Welcome/Introduction
   1. Mr. Bangerter reviewed the agenda for the MORR.
   2. Mr. Bangerter reviewed the MORR board membership.
      - Ms. Carolyn P. Dent, Chairperson, GSFC/Code 301, Systems Review Office.
      - Mr. John J. Hudiburg, GSFC/Code 599, 450 Senior Technical Authority.
      - Mr. Scott A. Greatorex, GSFC/Code 450.1, Chief, Networks Integration Management Office (NIMO).
      - Ms. Susan L. Hoge, GSFC/Code 595, Navigation and Mission Design Branch (Mr. David McKinley signing for).
      - Mr. Bradford Butts, GSFC/Code 761, Systems Management Branch (not present, but concurs).
      - Mr. Joseph Aquino, JSC/DD13, Manager, Space Communications Integration Office (SCIO) (Ms. Jewel Hervey signing for).
      - Mr. Donald W. Shinners, GSFC/Code 452, Space Network Project.
      - Mr. James A. Bangerter, GSFC/Code 450.1, Human Spaceflight Network Director.
   3. Mr. Bangerter stated that 2012 will be a busy year for the network. There will be a SpaceX and ATV launch in the upcoming months.
   4. Mr. Bangerter stated that the purpose of the MORR is to demonstrate that the network has analyzed, tested, and verified the requirements and to ensure that all NASA IN elements are ready to provide the required services. The MORR is the beginning of review in a series of mission reviews. Reviews will be held at the Johnson Space Center (JSC) as well.
   5. Mr. Bangerter stated that there currently are no open AIs or RFAs.
   6. Ms. Carolyn Dent stated that this is the third mission and asked the review board member to concentrate on new requirements of network configuration changes.

B. ATV-3 Mission Overview
   1. Mr. Thomas Russell provided a project/mission summary. 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).
   2. Mr. Russell reviewed the Mission Summary. He stated that the launch is scheduled for March 9, 2012/Day of Year (DOY) and Window 069/0951 – 1013Z. Docking to the ISS will be March 19, 2012. The backup launch window is one launch attempt per day for 2 days with a stand down on the third day to replenish the Liquid Oxygen (LOX) tanks. The launch vehicle is an Ariane 5 that will be launched from Kourou, French Guiana. The primary payload is 8 tons of supplies. Docking is scheduled for March 19, 2012. Undocking is scheduled for August 27, 2012 and reentry is scheduled for August 29, 2012.

3. Mr. Russell reviewed ISS Supply Sequence. The supply sequence illustrates the activities during the different increments.

C. Integrated Network (IN) Requirements
   1. Mr. Russell reviewed the IN requirements for the Eastern Range (ER), Communication Service Office (CSO)/NASA Integrated Services Network (NISN), Flight Dynamics Facility (FDF), Space Network (SN), and Network Integration Center (NIC). The ER Data Base Record (DBR) has been updated to state that the ER is contingency-only support. Mr. John Hudiburg asked if C-band support was used on the previous two missions. Mr. Russell stated that it had. Mr. Bangerter stated that there will be no C-band on this mission. C-band support has been removed as a cost savings and the customer has approved this change.
   2. Mr. Russell reviewed the Launch Hold Criteria. Tracking and Data Relay Satellite (TDRS) support is required as part of the launch criteria for ATV-3.
   3. Mr. Russell reviewed the Networks Configuration diagram which illustrates how the network will support the mission. Ms. Dent asked if the diagram show which TDRS' will be used. Mr. Bangerter stated that the specific satellites have not been scheduled yet. The specific satellites will be scheduled during the Forecast Period.
   4. Mr. Russell reviewed the documentation. The table shows what documentation is or will be in place and when including Interim Support Instructions (ISI). All documentation is up to date.

D. Analysis and Testing
   1. Radio Frequency (RF) Analysis. Ms. Nancy Huynh reviewed the RF analysis.
      (a) The forward service is at the nominal frequency of 2106.4 MHz. ATV command support is 1 kbps/2 ksps and may be requested for S-band Single Access (SSA) or Multiple Access (MA). Return services is at the nominal frequency of 2287.5 MHz. ATV real-time telemetry is 8 kbps/16 ksps and may be requested for SSA or MA. ATV telemetry dump support is at 64 kbps/128 ksps on SSA. All return service margins are positive.
      (b) Ms. Huynh stated that there is a risk to ATV SN support during periods when the ephemeris uncertainty exceeds +/- 9 seconds until a more accurate set of ATV vectors are received at the White Sands Complex (WSC). This non-compliance period is similar to the other missions. Ms. Dent asked if there were any issues on the previous missions. Mr. Bangerter stated that there were not. Mr. Scott Greatorex asked if the risk condition existed and Mr. Bangerter stated that it had.
      (c) The forward links 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.
      (d) The analysis has been documented in the RF Interface Control Document (ICD) which is under configuration control. Ms. Huynh reviewed the RF analysis table.
   2. Networks Feasibility Analysis. Mr. Chris Schwartz provided a networks feasibility analysis overview.
      (a) SN Nominal Operations Periods. Analysis of ATV-3 requirement of one 20-minute SSA event per orbit from any available 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 SGLT 3).

(b) SN Peak Loading Periods. ATV-3 launch on the same day as Commercial Orbital Transportation Services (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).

(c) Conclusion. Mr. Schwartz stated that there are no impacts and there are no issues in satisfying the requirements.

3. RF Compatibility Testing Results. Mr. Stephen Leslie stated that the ATV Category II RF compatibility test was conducted at the European Aeronautic Defense and Space Company (EADS) Space Transportation (ST) facility in Germany from May 17 – 21, 2004. There has been no further testing since ATV-1.

E. Networks Requirements Verification Results. Mr. Russell reviewed the completed testing. The Backup Control Center (BCC) – Huntsville Operations Support Center (HOSC) retest on 12/21/2011 did not meet all requirements. The commanding through the HOSC objective failed. A retest will be conducted. Ms. Dent asked if the root cause is known and how critical the capability is to the mission. Mr. Russell stated that the investigation is ongoing. Mr. Bangerter stated that the capability is not mandatory for launch. Mr. Bob Marriott stated that the capability is required for the mission, but not for launch. Mr. Scott Greatorex asked if any of the System Validation Test Slots (SVT) were radiated tests. Mr. Russell stated that all were. Mr. Russell reviewed the pending testing to be completed. Mr. Russell provided an overview of the ATV-3 test matrix.

F. Launch Activities. Mr. Russell reviewed launch activities

1. Launch Day Sequence of Events (Launch Count). Mr. Russell reviewed the Spaceflight Mission Manager (SMM) console support and mission staffing.
2. IN Timeline Summary. Mr. Russell reviewed the timeline. The timeline includes the required Logical Port Addresses (LPA).
3. Freeze Plan. Mr. Russell reviewed the times at which the different IN elements go into their mission freezes.

G. Networks Status

1. ER Operations. Mr. Mike Gawel was not present. Mr. Jim Bangerter stated that ER support is contingency only. A procedure is in place. This support posture applied to Soyuz as well and has been exercised. The procedure is well documented. Mr. Bangerter stated that the ER is ready to support the ATV-3 mission. Mr. Hudiburg asked, in the absence of an ER representative, how Mr. Bangerter can be certain the ER is prepared. Mr. Bangerter replied that an agreement and procedure are in place and the procedure has been exercised. The ER will provide a list of available radars 30 days in advance of the launch. For example, we already have the

list for the upcoming SpaceX Demo mission. There is a well established, good line of communication with the range.

2. SN Operations. Mr. Erik Richards provided an SN operations status. There have been no hardware changes since the last Visiting Vehicle (VV) mission (Soyuz-29). The Obsolescence Driven Avionics Redesign (ODAR) software delivery 001 was delivered to the White Sands Ground Terminal (WGT) on 12/08/2011 and the Second TRSS Ground Terminal (STGT) on 12/15/2011. Ms. Dent asked how the WSC verified that no other functionality was impacted by the delivery. Mr. Richards stated that the delivery added test ports only. ODAR testing was successfully completed. The test ports have no bearing on ATV operations. There are no open Discrepancy Reports (DR). There are no outstanding documentation items. Staffing is sufficient to meet all requirements. All required personnel are trained and certified. Mr. Richards stated that the SN is ready to support the ATV-3 mission. Mr. Hudiburg asked the status of F10. Mr. Bangerter stated that F10 will be operational and redesignated at TDRS West on 01/23/2012.
3. FDF Operations. Mr. Warren Mitchell reported that the FDF has implemented a new modernized software and hardware system that provides a new communications front end with new external interfaces. The new system successfully supported Soyuz-29. The FDF is now totally on the new modernized side. Mr. Mike McKinley stated that the legacy system was decommissioned as the end of 2011. There are no open DRs. There are no outstanding documentation items. Staffing is sufficient to meet all requirements. All required personnel are trained and certified. Mr. Mitchell stated that FDF is ready to support the ATV-3 mission.
4. CSO Operations. Mr. Randy Honeycutt provided the CSO/NISN status.
   (a) Mr. Honeycutt reviewed the Voice and data services and their respective participants.
   (b) There have been no software changes since the last VV mission (Soyuz-29).
   (c) The Mission Operations Voice Enhancement (MOVE) Type D keyset retrofit is ongoing. There were 379 keysets installed at GSFC. To date, 96 have been retrofitted. The retrofit is scheduled to be complete in mid February. The Nortel Router upgrade is also in work. The current routers are obsolete and not supported by the vendor. The equipment has been delivered to the sites and is in different stages of installation. The project is scheduled to be complete by the end of May. No new routers have been connected to the operational network.
   (d) There are no Problem Management and Dispatch System (PMDS) tickets.
   (e) There are no outstanding documentation items.
   (f) Staffing is sufficient to meet all requirements.
   (g) All required personnel are trained and certified.
   (h) CSO will process all FERs during the mission in accordance with CSO SOP-002.
   (i) Mr. Honeycutt stated that CSO is ready to support the ATV-3 mission.
5. NIC Operations. Mr. Eric Mount provided a NIC operations status.
   (a) There have been no software or hardware changes since the last VV mission (Soyuz-29).
   (b) Mr. Mount noted that the Space Shuttle unique equipment has been deactivated without impact to NIC operations. Removal of the equipment is in progress.
   (c) There are no open DRs.

(d) There are no outstanding documentation items.
(e) There are two Freeze Exemption Requests (FER) in the system.
(f) Facilities are Green.
(g) Staffing is sufficient to meet all requirements.
(h) All required personnel are trained and certified.
(i) Mr. Mount stated that the NIC is ready to support the ATV-3 mission.

6. Points-of-Contact (POC). Mr. Russell reviewed the mission POCs.

H. Integrated Network Summary. Mr. Russell provided an IN summary.

1. Mr. Russell stated that there are currently no risks. (Editor's Note: After the MORR Mr. Greatorex expressed concern in regards to the +/- 9 second uncertainty for SN support. He requested that a risk be opened. Mr. Bangerter will open a risk.)
2. Mr. Russell reviewed the open work which includes standard testing such as the WSC Mission Readiness Test (MRT) and the BCC-HOSC retest.
3. There is no non-standard open work.
4. There are no issues or concerns.
5. Mr. Russell stated that the IN is ready to support the ATV-3 mission.

BOARD COMMENTS

Ms. Dent polled the Review Board for their comments. All the board members stated that the network is ready to support the ATV-3 mission.

ACTION ITEM REVIEW

No action items were assigned at the January 5, 2012, ATV-3 MORR.

RFA REVIEW

No RFAs were assigned at the January 5, 2012, ATV-3 MORR.

(Original Approved By)
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