



Automated Transfer Vehicle (ATV-2) Mission Planning Status



09/14/10

L. Clark GSFC/SMM
M. Venable JSC/ISS GC



Agenda



- **Mission Overview**
- **Integrated Network Overview**
- **Mission Profile**
- **Documentation/RFICD update**
- **Space Network Support**
 - TDZ
- **TDZ Restrictions**
- **C-Band Support**
- **GSFC Support: NIC, FDF, NISN**
- **Network Testing**
- **Integrated Network Staffing Plan**
- **Open Discussion**



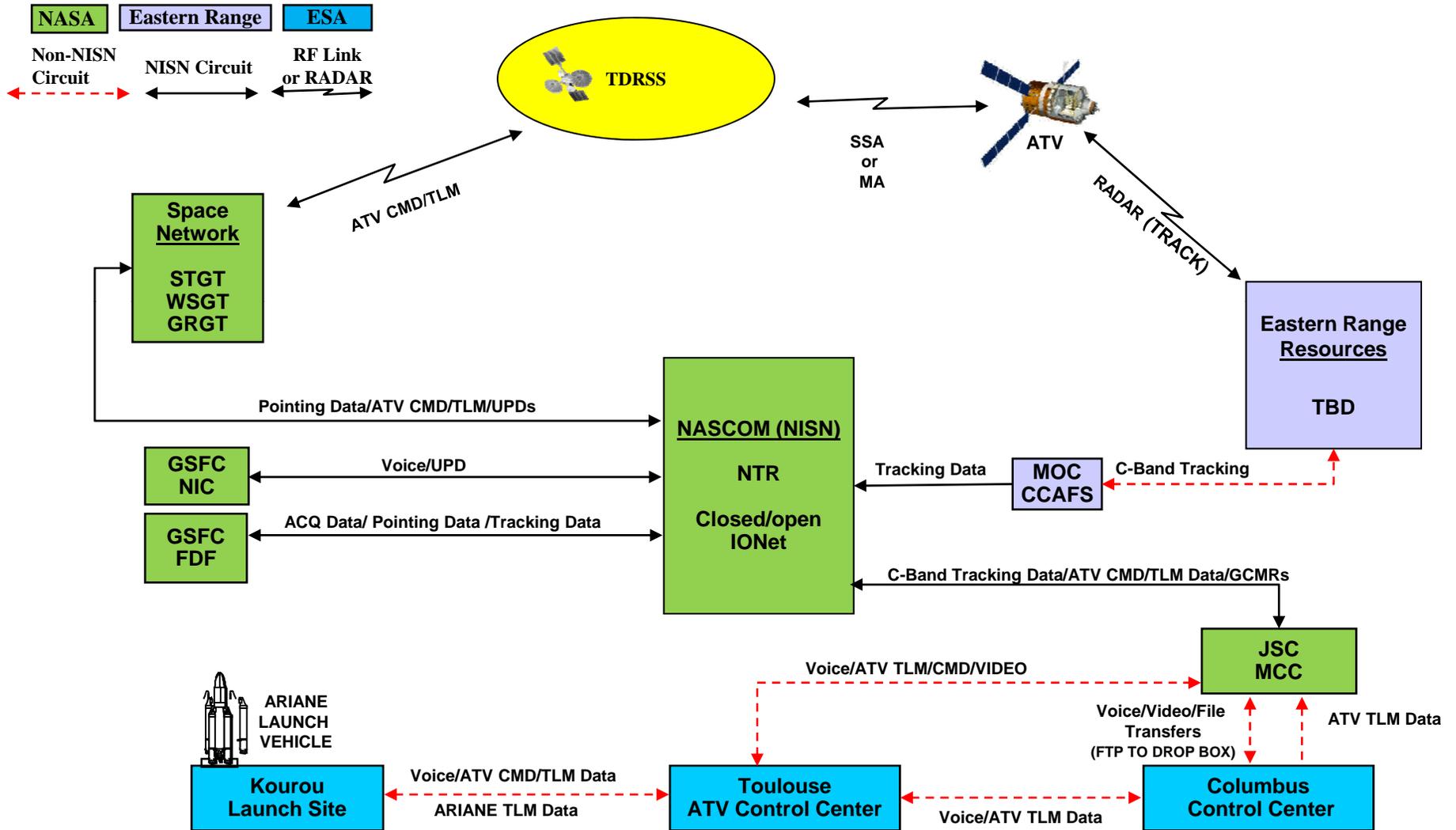
Mission Overview

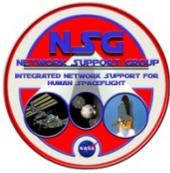


- **Visiting Vehicle:** Automated Transfer Vehicle (ATV-2)
"Johannes Kepler"
- **Launch Date/Time:** 12/16/10 Time TBD
- **Launch Vehicle:** Ariane-5 from Kourou, French Guiana
- **Inclination:** 51.6 degrees
- **Rendezvous and Dock:** 12/18/10
- **Undocking:** 05/10/11

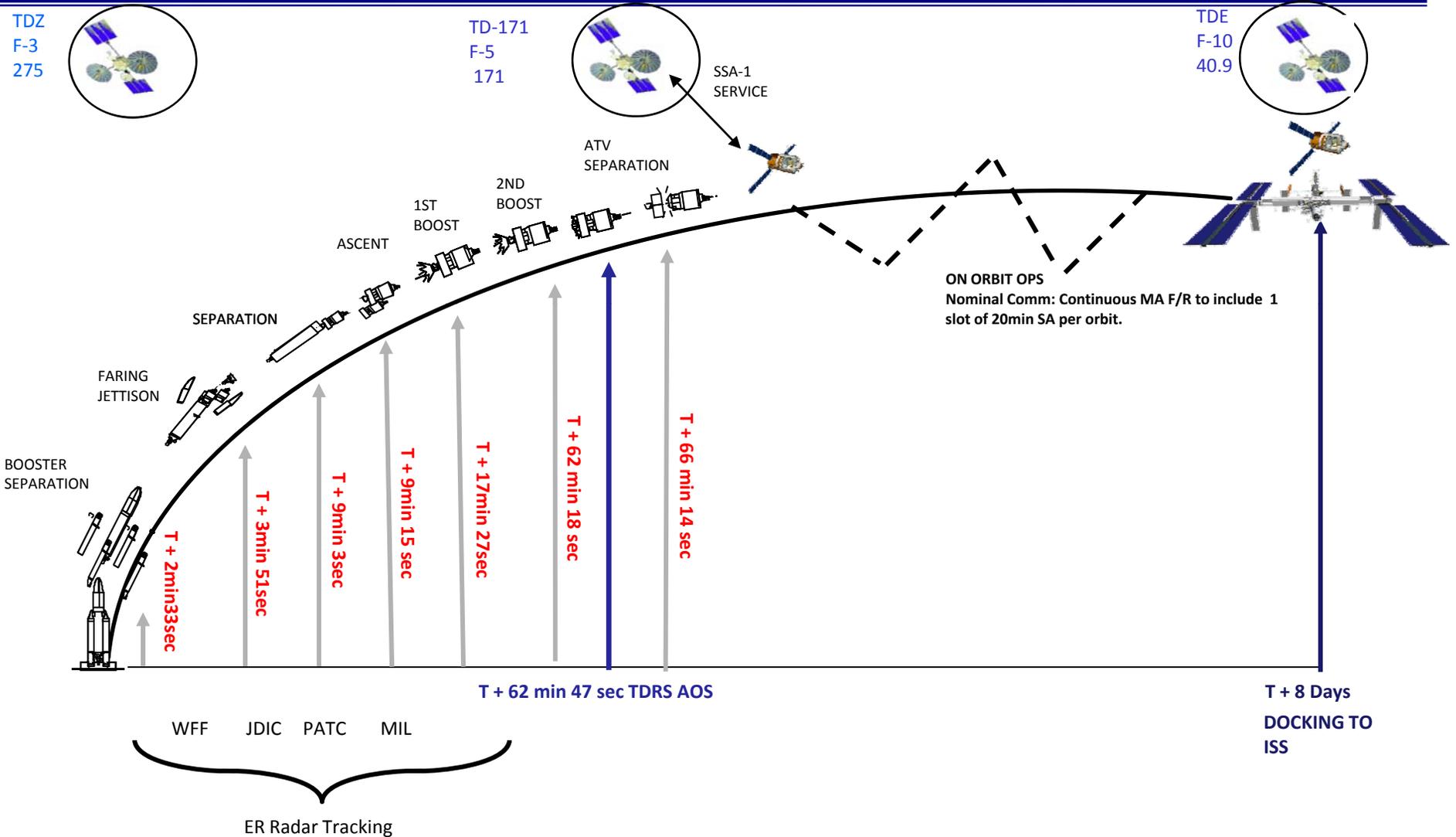


Integrated Network Overview





Mission Profile





Documentation



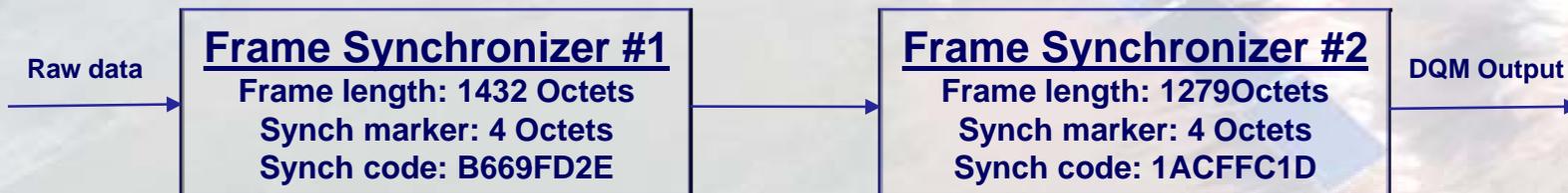
Document Title	Published Date	Comments
<i>Radio Frequency Interface Control Document (RFICD) for ATV</i>	June 2004 DCN 1 Jan, 2008	May Need Updating***
<i>ATV Annex to the TDRSS Network</i>	June 2007	450-TNOSP-ISS ATV Annex
Draft Launch Count	L-60 days	Will need inputs from JSC
ISI 001 Pre-mission Status	L-30 days	
ISI 001 Mission Status	L-10 days	
ISI XXX Launch Count	L-10 days	
ISI XXX NASA/DOD Radar Support	L-10 days	Documents C-Band Support for ATV-2
ISI XXX Critical Mission Period	L-10 days	Will need inputs from JSC
ISI XXX ATV-2 Offset Frequency Authorization	L-10 days	Transmit frequency to 2079 MHz to avoid interfering with ARTEMIS
ISI XXX HW/SW Freeze	L-10 days	
ISI XXX Requirements for ATV-2 SN Daily Support Totals	L-10 days	WSC to generate ATV-2 TDRSS Daily Totals
ISI XXX Mission Termination		



Documentation - RFICD Update



- **RFICD states:**
 - Frame length: 1279 Octets
 - Synch Marker: 4 Octets
 - Synch Code: 1ACFFC1D
- **Data as tested during HSOC/BCC Checkout (9/08/10):**
 - Frame length: 1432 Octets
 - Synch marker: 4 Octets
 - Synch Code: B669FD2E





Space Network Support



- TDRS Comm Coverage**

EVENT	DATE
SVT2 - Kourou	September 29 & 30, 2010
Prelaunch	December
Launch Date	December 16, 2010
Free Flight phase up to docking	8 days + 3 days of launch scrub = 11 days
Docking Date	December 24, 2010 (Launch + 11 days)
Reboost Activities	Total: 4
Attitude Control	Total: 7
Refueling Activities	Total: 1
Other attached Phase: Water & gas Ops	Total : 11 (3 BIC, 3 waste transfers, 5 gas transfers)
SSA Feathering due to hotspots	Total: 7
Undocking	May 10, 2011



Space Network Support (cont'd)



- **Launch & Early Orbit Phase (LEOP)**
 - **Continuous SSA coverage**
 - **Start of TM signal (separation – 10 min) thru Transfer to Phasing Maneuvers**
 - **(TP1 & TP2)**
 - **Tracking Data coverage (Coherent)**
 - **End of SGS Deployment (separation +~35 min) for 2 orbits**



Space Network Support (cont'd)



- **Routine Phasing**
 - **MAF/R Continuous and SSA 20 min/orbit**
 - **SSA 20 min/orbit will be requested**
 - **Tracking Data coverage (Coherent)**
 - **During predicted operations, ephemeris and state vectors will be delivered to ATV-CC approximately 60 minutes after each tracking period**



Space Network Support (cont'd)



- TDRSS SA, SMA and MA services will be scheduled pre-launch, launch, insertion, parked, docked and re-entry as defined in the requirements

TDRSS Service	Mode of Operation	Telemetry Data Rate
SSAR	Real-time Mode I channel Q channel	Single Access 8 kbps 8 kbps
	Dump & Troubleshooting Mode I channel Q channel	64 kbps 64 kbps
SMAR/MAR	Real-time Mode I channel Q channel	Multiple Access 8 kbps 8 kbps
SSAF	Low Data Rate Mode DG1 Mode1	Single Access 1 kbps
MAF	Command Mode DG1 Mode1	Multiple Access 1 kbps



Space Network Support (cont'd)



- **Simultaneous TDRS and Artemis Support**
 - ISS GC will transmit a GCMR to offset the Forward Frequency
 - Forward Frequency offset will be documented in an ISI
- **WSC Data Hold**
 - Media Hold Requests needs to be submitted prior to the 50 hours
- **RF Performance Data from WSC**
 - JSC will give WSC sufficient notification for requested timeframes



TDZ Restrictions



- **TDRS-275 REQUIREMENTS (TDRS-7)**
 - Events will be scheduled on the SA2 antenna only
 - No routine user access is available on SA-1
 - Full utilization on the Eastern and Western TDRS satellites
 - Minimize time to be scheduled on TDRS-275
 - The SA1 antenna can only be scheduled if:
 - Times that are designated as Super Critical* in the Critical Period Restriction ISI
 - Preapproved by the NASA Network Director



C-Band Support



- **ATV-2 supports: 5 Total**
- **C-Band usage for the ATV-2 Mission will be identified L -21 days**
- **SMM will conduct a telecon several weeks prior to launch with DOD Track/Eastern Range to review C-Band supports for ER conflicts**
- **SMM will coordinate and submit the schedule request for C-Band support to the ER**



GSFC NIC Mission Support



- **Pre-mission:**
 - Plan, conduct and execute testing
 - Interface with the Integrated Network
 - Troubleshoot as needed
- **Launch/On-orbit:**
 - Monitor SN events during staffed timeframes
 - Generate ISIs as needed
 - Assist JSC in resolving SN Scheduling conflicts as needed
 - Conduct shift briefing for each shift



GSFC FDF Support



- **FDF Support:**
 - Provide pre-mission analysis of C-band and TDRSS coverage
 - Provide Orbit Determination support using coherent TDRS and/or C-band tracking data after insertion, prior to/after maneuvers, and daily during non-maneuver periods prior to docking
 - Provide solution vectors to ATV-CC via JSC
 - Provide acquisition data support to C-band sites and the Space Network based on ATV vectors received from ATV-CC via JSC or from FDF orbit determination solutions
 - Provide TDRSS vector support to the JSC and ATV-CC
 - Evaluate ATV-2 tracking data
 - JSC to provide FDF with pre-mission trajectory data/vectors
 - JSC to ensure coherent TDRSS tracking events are scheduled pre & post maneuver



GSFC NISN Support



- **NISN Support:**
 - Provide voice communications
 - Provide data transport
 - Assist in Integrated Network troubleshooting as needed





Network Testing



Test	Date	Comments
SVT1 Antenna Calibration Bremen, Gemany	April 6, 2010	Successful – in preparation for SVT1 testing
SVT1 Bremen, Gemany	April 8 & 9, 2010	Successful
HSOC-Backup Control Center (BCC) C/O	of May10, 10 2010	Objectives Not Met
HSOC-Backup Control Center (BCC) C/O	July 15, 2010	Objectives Not Met
HSOC-Backup Control Center (BCC) C/O	September 8, 2010	<ul style="list-style-type: none"> • Objectives Not Met • MSFC operating in SCD V6.1 • AVTEC cards” cards are installed in the SCD V6.1 • Goddard will ship a SCD with V6.2 and “fastcom cards” to MSFC. • Retest will be perform after installation
SVT2 Antenna Calibration Kourou	Sept 23, 2010	



Network Testing (cont'd)



Test	Date	Comments
SVT2 Kourou	Sept 29, 2010 Sept 30, 2010	Final link & Encryption Validation
JSC/WSC/GSFC/RFSOC Checkout	TBD	As needed
SN Vector Verification	L-7 Days	
WSC MRT	L-7 Days	



Integrated Network Staffing Plan



- **GSFC NIC and WSC Test Operations and Analysis (TO&A) Support:**
 - Launch -4 hours through ascent phase
 - On-call for TDRS critical periods
 - 4 hour prior to docking and continuing through docking critical period
 - Undocking: undocking critical period and TBD for reentry
- **Flight Dynamic Facility (FDF)**
 - TBD
- **NASA Integrated Services Network (NISN)**
 - Comm Manager 24x7
 - Mission Comm Manager: TBD
- **Eastern Range (C-Band Radar)**
 - TBD

