



SN Scheduling



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International Space Station (ISS)/Visiting Vehicle TDRS Scheduling Approach



- **Recommended TDRS utilization during Visiting Vehicle missions**
 - **ISS**
 - **TDRS-EAST, TDRS-WEST, and TDRS-275**
 - **Visiting Vehicles**
 - **TDRS-SPARE SA-1, TDRS-171/SA-1 and TDRS-275 SA-1/SA-2**
 - **No TDRS limitation for SSA/MA/SMA services**
 - **This proposal will allow greater flexibility for re-scheduling launch slips**



WSC Scheduling Timeline



Planning							Forecast Scheduling Period							Confirmed Schedule Released							Real-time Scheduling Period													
day-1							day-7							day-14							day-21							day-28						
M	T	W	TH	F	S	S	M	T	W	TH	F	S	S	M	T	W	TH	F	S	S	M	T	W	TH	F	S	S							
Week 1							Week-2							Week-3							Week-4													
<p>WSC activities requiring TDRSS service downtimes are planned and coordinated with the customers for execution during the week-4 time frame. Customers requiring critical TDRSS support during Week-4 should notify Forecast Scheduling during the Planning week</p>							<p>WSC TDRSS downtime activities, internal maintenance /ETN/STN/EC requests, project testing, and customer SARs are scheduled in the forecast time frame. The batch schedule is developed based on the SN priority List. All requests to be scheduled for week-4 should be delivered to the WSC by 1200Z Monday of week-2. Requests received after this time frame will be on an available basis</p>							<p>After the confirmed schedule is transmitted and becomes real-time, the priority list does not apply; priority is given to the confirmed scheduled request, except for the absolute priorities listed in the SN priority list</p>							<p>In the event of a real-time emergency, operations management may enforce and/or temporarily amend the priority list as necessary. In the event of a conflict in priorities, the issue will be escalated to the Network Director (ND) Code 450.1</p>													





Visiting Vehicle Launch Slip



- **ATV-2 Lessons Learned**
 - **Late Scheduling of ATV-2 Critical Launch Events**
 - Launch on 02/15/11 scrubbed and was rescheduled for 02/16/11
 - ATV threatened scrub the Launch due to gaps in TDRS coverage
- **TDRS communication management for launch slips**
 - **SN Schedulers will bump conflicting customers to ensure launch and critical periods through L+48 hours are scheduled (per ND sked initial 3 orbits and await launch before further schedule changes???)**
 - **SN Schedulers require notification of a “slip” ASAP**
 - **This process will take ~8-12 hours to reserve the first 48 hours of critical time. Visiting Vehicle critical events can be “conditionally” guaranteed**
 - **Updated Critical Period ISI required to begin process of scheduling new launch/early orbit events**





Visiting Vehicle Mission Coordination



- **GSFC SMMs and WSC Forecast Scheduling review customer testing and launch requirements on a weekly basis**
- **Scheduling Mission Teleconference**
 - L-30 days
 - GSFC SMMs/WSC Forecast/JSC GC
 - Review Launch requirements
 - Review Launch scrub plan
 - Enhance communication



ISS/VV Critical Period ISI Process



- **Forecast Scheduling Period**
 - JSC GC issues Critical Support Request defining GMT date/times for freeze period to Network
 - SMM issues an ISI based on the critical request
 - Transmitted within 1 working day of receiving request
 - WSC Long Range Forecast schedule is updated
- **Real-time Scheduling Period**
 - Requests received within two days of critical support
 - GC will verbally advise SMM of support request
 - If outside nominal working hours the SMM call up list will be utilized
 - SMM will verbally advise SN Real-time Scheduling and transmit the ISI as soon as possible
- **Unresolved TDRS conflicts elevated to NASA ND via the SMM for resolution**





Freeze Policy for ISS Critical Period ISI



- **Critical ISI implements Human Space Flight (HSF) freeze policy**
 - TDS/TD171/TD275 and associated equipment frozen at minus 8 hours
 - Exceptions require NASA ND approved Freeze Exemption Request (FER)

See backup for ISS ISI example



TDRS Constellation



- October through December 2011

SGLT	TDRS	NAME	LONGITUDE
SGLT-1	TDRS-6	West	171
SGLT-2	TDRS-K	Test	
SGLT-3	TDRS-5	171	167.5
SGLT-4	TDRS-9	East	41
SGLT-5	TDRS-3	Spare	49
SGLT-7	TDRS-7	275	275





TDRS Constellation



- January through March 2012

SGLT	TDRS	NAME	LONGITUDE
SGLT-1	TDRS-K	Test	
SGLT-2	TDRS-10	West	174*
SGLT-3	TDRS-9	East	41
SGLT-4	TDRS-5	171	167.5
SGLT-5	TDRS-3	Spare	49
SGLT-7	TDRS-7	275	275

TDRS-10 Relocation Stop maneuvers: 11/7 through 11/11. Drift to 174 degrees W, on location 12/2.
*TDRS-6 replaced by TDRS-10 as TDRS-WEST (Mid January 2012). TDRS-6 Drift start (TBD) to location (TBD).





WSC Major Activities November 2011 to February 2012



- **TDRS-10 STOP MANEUVERS 11/07-11/11 slow to .65 deg/day, arrive @ 174W by 12/02 (will be utilized for TDRS-K SGLT-2 testing)**
- **TDRS-K SGLT-2 integration and test 09/20/11-01/15/12**
- **TDRS-K SGLT-1 integration and test 01/16/12-03/16/12**
 - Requires TDRS-EAST configured to SGLT-3 (no SMA)
 - Requires TDRS-WEST configured to SGLT-2
 - Requires TDRS-171 configured to SGLT-4
- **TDRS-4 EOM ACTIVITIES - 11/06/11-12/15/11**
- **TDRS-6 DRIFT location (TBD), DRIFT START (TBD)**



WSC Major Activities November 2011 to February 2012 (cont'd)



- **Launches/Critical activities**
 - Soyuz-28S dock 11/16 (ISS critical)
 - Soyuz-27 undock 11/22 (ISS critical)
 - Atlas-V/MSL launch 11/25-12/18
 - Soyuz/ISS-29S 12/26/11
 - Falcon-9 SPACEX 1/12/12
 - Soyuz/ISS-46P 1/26/12



Open Discussion





Backup





ISS ISI Example



ISI NR. 587 M8000MS ISS

Subject: Mission Configuration Freeze for Progress 45P Docking. The following time frame on November 2, 2011 is designated as an ISS Critical Support Period

- 1. Critical TDRS support times for scheduling purposes are as follows: DOY 306/0706Z to 306/1436Z. docking : DOY 306/1036Z**
- 2. The following elements will be frozen 8 hours prior at: DOY 305/2306Z to 306/1436Z.**

A. Space Network

TDRS and associated equipment TDS, TD171, TD275

Common equipment:

DIS-ADPE, DIS-LRDS, DIS-HRDS, DIS MDM, CTFS, NCCDS, SNAS

B. NISN: Resources supporting ISS

- 3. The following elements will be frozen 24 hours prior at:**

DOY 305/0706Z to 306/1436Z

A. GSFC: NIC

B. WSC: VHF-1/VHF-2 for contingency support

C. WGS: VHF-1/VHF-2 for contingency support

D. DFRC: VHF-1/VHF-2 for contingency support

- 4. Release will be provided by the JSC ISS GC in the event of an early termination or extension of the activity**





ISS ISI Example (cont'd)

5. Freeze will include suspension of any scheduled or unscheduled maintenance activities or other work which may affect any inter-center voice and data circuits required for ISS support

6. An SMM will be on call to provide support if required.

Reference SMM ISS Call-Up List

7. Hardware and software freeze critical support requirements are documented in Configuration Management Freeze Policy for the Integrated Networks and Supporting Elements (450-CMFP-HSF/ELV, dated June 2007)

8. This ISI is self canceling upon completion of the scheduled support

