



2R FRR Mission Services

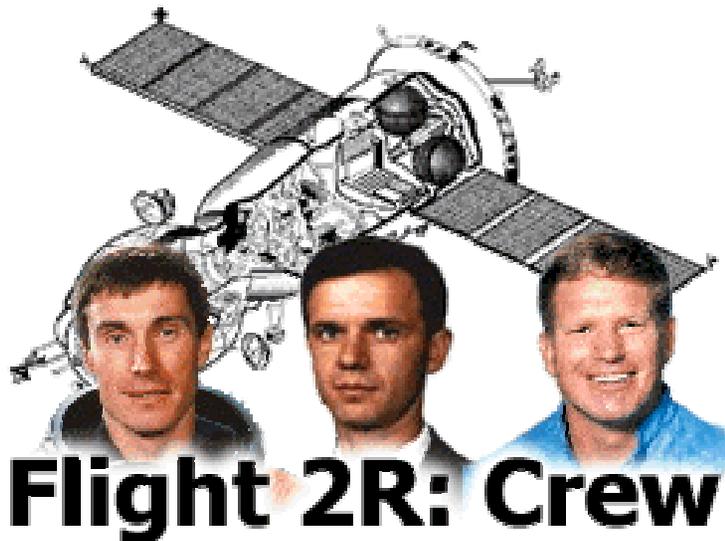
GSFC-0455:(NAS/PPT):C:N:1



Flight 2R - Increment 1 Flight Readiness Review Networks

Agenda

- Network Support Requirements
- VHF Network
- Significant Changes
- C-Band Radar Status
- Soyuz Ground Track
- Acquisition Data Plan



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Network Support Requirements

- **VHF-2**
 - **VHF-2 A/G support is planned for Soyuz Flight 2R (October 30) from early orbit through ISS docking for WPS, WSC, and DFRC view periods**
 - **VHF-2 is required for Soyuz as backup emergency communications while docked to ISS**
 - **Soyuz becomes the crew return vehicle. In the event of emergency operations, VHF-2 A/G will be required**
 - **Prime pointing source for VHF-2 is FDF generated two line elements**
- **VHF-1**
 - **After docking, ISS full-period 24 hours a day, 7 days a week VHF-1 support is required for WPS, WSC, and DFRC all views (and follow-on missions)**
 - **Prime pointing source for VHF-1 is FDF generated two line elements**



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Network Support Requirements (con't)

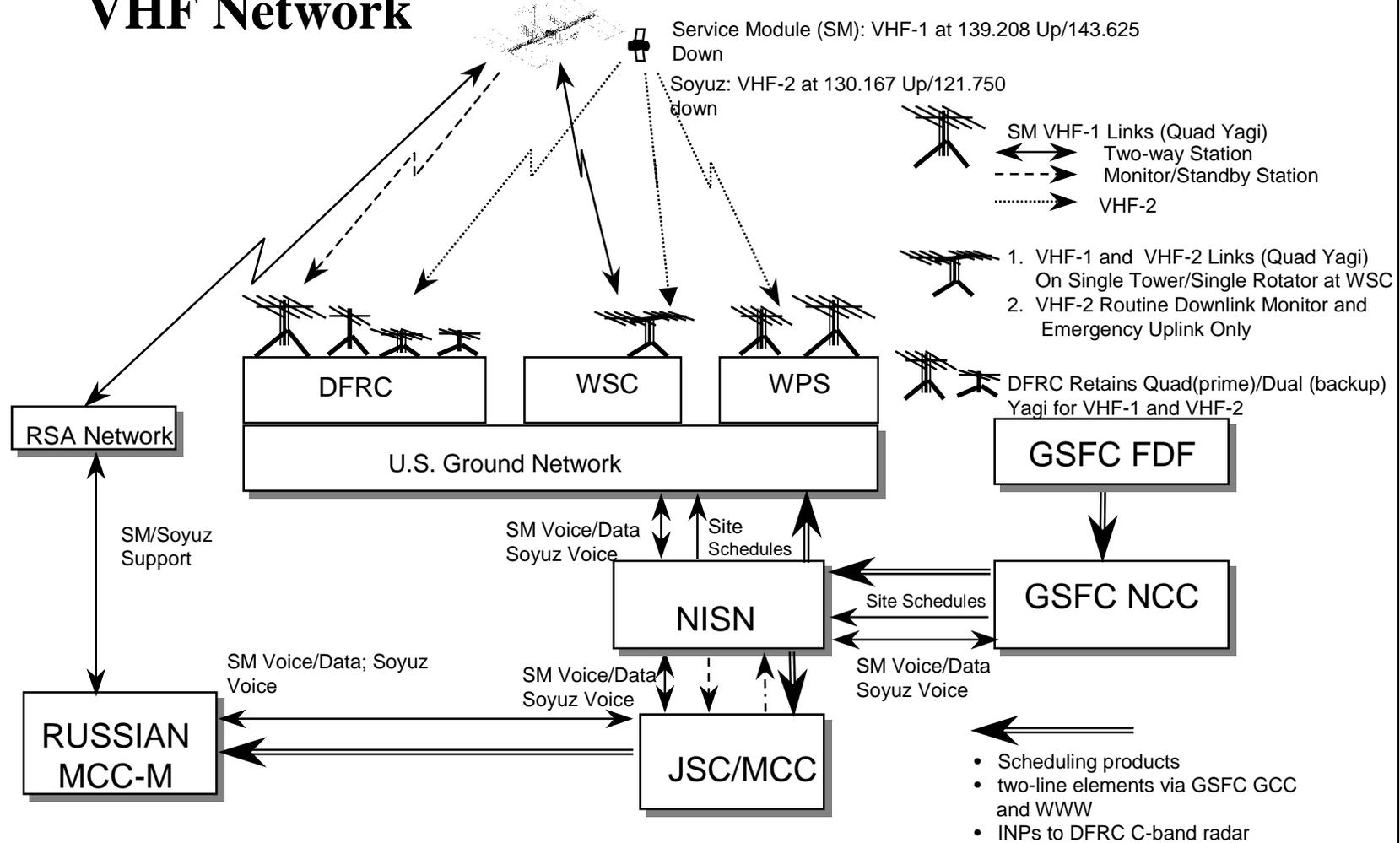
- **C-band Radars**
 - **NASA DOD Radar support required for Soyuz early orbit support prior to docking**
 - **Estimated at 15 passes per year**
 - **C-band metric data support**
 - **Tracking of Soyuz for VHF-2**
 - **C-band slaving at WPS and DFRC as backup pointing source; C-band slaving will not be available at WSC for Soyuz Flight 2R**
 - **May include other ISS free flying elements as required (and follow-on missions)**



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VHF Network





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VHF Network Scheduling

- **The Houston Scheduling Group (HSG) in Moscow or the Mission Operations Planners in Houston initiates requests to the Wallops Scheduling Office (WSO) for Soyuz VHF support**
- **Real-time requests within 24 hours may be verbal to the NCC TM and followed up by email**
- **NCC TM is available to assist WSO in resolving schedule request issues**
- **WSO transfers initial schedules and updates to participating sites in the operations scheduling format**
- **WSO inputs support request to WOTIS**
- **WOTIS transfers one-line schedule activity to supporting sites**
- **Wallops Scheduling will be staffed from launch through docking and activation**



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Significant Changes

- **VHF Ground Network**
 - **WPS VHF-2 Soyuz early orbit/free flyer/De-orbit A/G voice support**
 - **New dual string transmit/receive system RF switched to Quad Yagi array installed in June/July 2000**
 - **Transmit power increased from 150 to 350 watts**
 - **Included new DC azimuth motor to correct pointing anomaly and tracking lag through zenith**
 - **New STARRS software in development will be installed to replace COTS software in early October**
 - **Direct C-band slaving capability to WPS radar planned as addition**
 - **Includes capability to use DOD C-band MDFF data for pointing control**



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Significant Changes (con't)

- **VHF Ground Network (cont'd)**
 - **WSC Soyuz VHF-2 early orbit/free flyer/De-orbit support A/G voice support**
 - **Quad Yagi array; new DC azimuth motor installed at WSC**
 - **STARRS software with C-band MDDF pointing reference capability to be implemented in 2001**
 - **DFRC Soyuz VHF-2 early orbit/free flyer/De-orbit support A/G voice support**
 - **Transmit power increased from 150 to 350 watts**
 - **C-band slaving capability to DFRC radars implemented**



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Significant Changes (con't)

- **VHF Ground Network (cont'd)**
 - **WPS/WSC ISS Service Module (Zvezda) VHF-1 systems A/G voice and packet data support**
 - **WPS system will have new DC azimuth motor installed in late October**
 - **No changes at WSC**
 - **DFRC ISS Service Module (Zvezda) VHF-1 Systems A/G voice and packet data support**
 - **No changes required**
- **Operations**
 - **SMM console will be staffed from launch through docking and activation**
 - **White Sands VHF Ops position interfaces and monitors support**



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C Band Radar Status

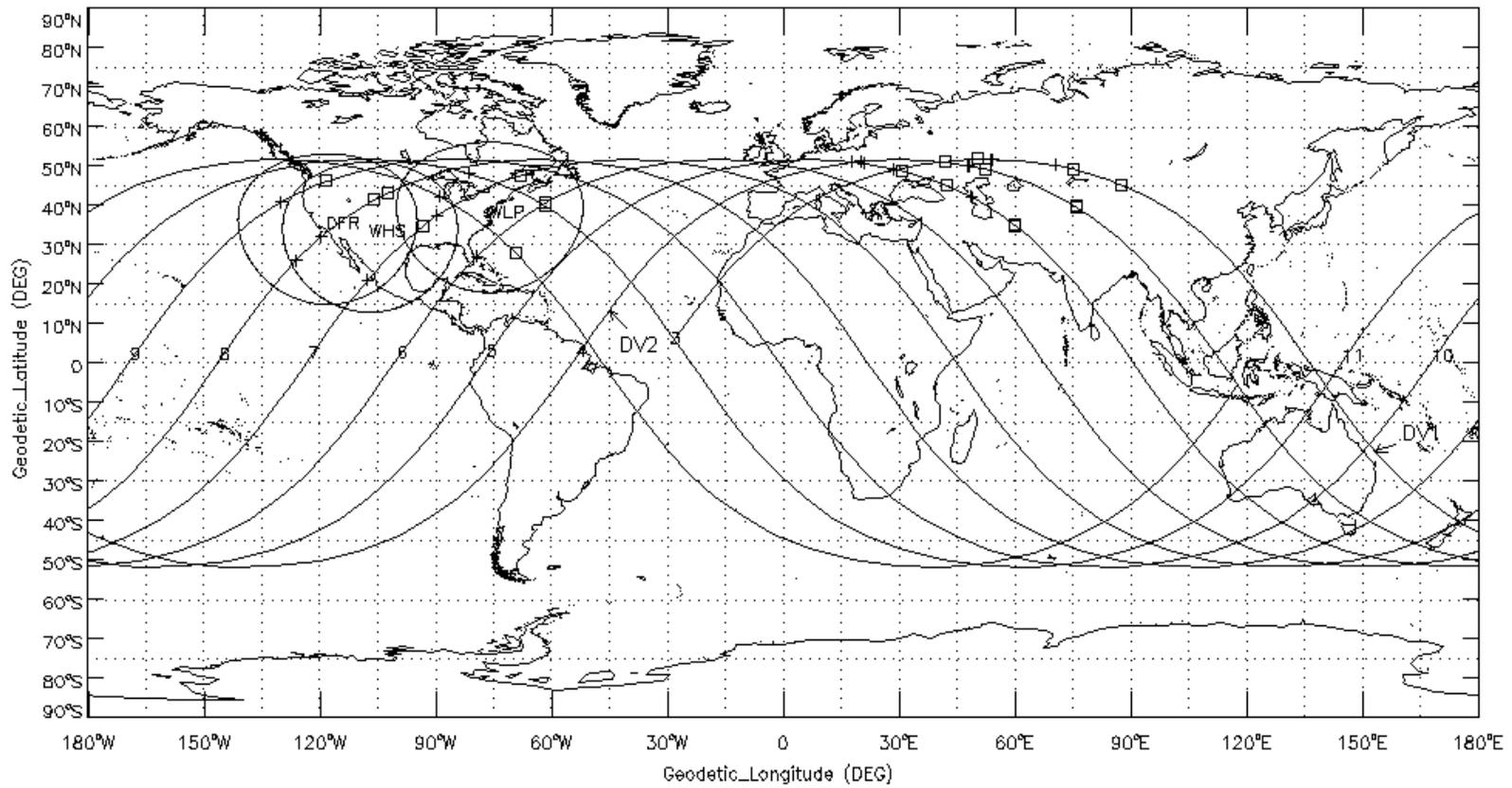
- **The following radars will be used:**
 - **Antigua**
 - **PATC or MLAC**
 - **FRCC**
 - **FDRC**
 - **WPS**
- **Current plan is to use Antigua for Orbit 05**
- **Antigua will generate and transmit two-line elements to PATC, MLAC, and WPS**
- **FRCC and FDRC will be used for DFRC slaving**
- **No significant hardware/software changes are planned**
- **All radar systems are “GREEN” and ready to support**



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Typical Soyuz Ground Track





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Acquisition Data Plans

- **Provide console support from launch through docking and activation**
- **Provide premission planning/scheduling products to the supporting stations, via the FDF Product Server, based on premission state vectors received from TOPOs**
- **Provide premission acquisition data to C-band radars**
- **Provide premission two-line elements to NCC Comm Center via e-mail for forwarding to VHF sites (WPS, WSC, and DFRC)**
- **Perform Soyuz orbit determination based on C-band tracking as backup to JSC Ground Navigation orbit determination**
- **Provide updated acquisition data to C-band radars and updated two-line elements to VHF sites (WPS, WSC, and DFRC) based on JSC orbit determination or updates from RSA via the TOPOs**
- **Perform metric tracking data evaluation**



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Soyuz Free Flyer VHF-2 Pointing Data Support

