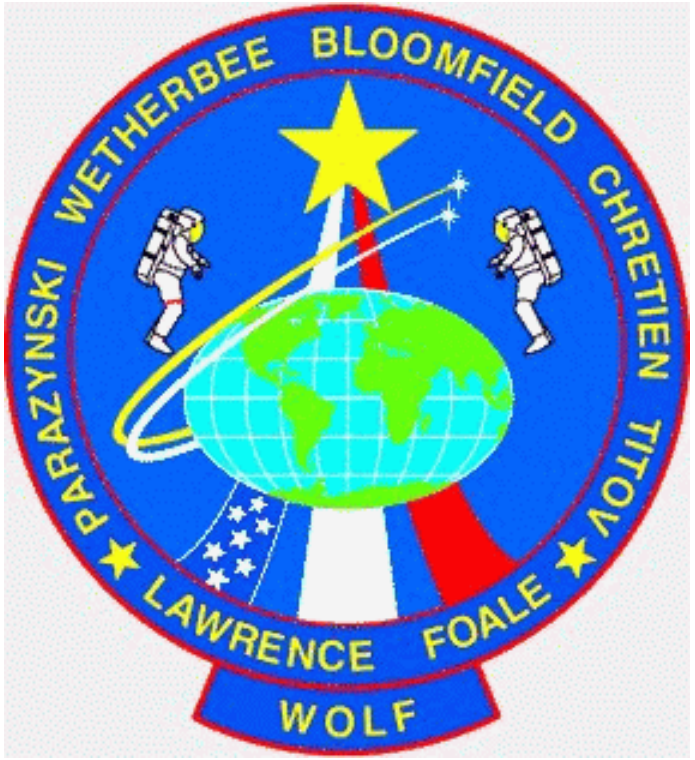
MISSION OPERATIONS
AND DATA SYSTEMS DIRECTORATE

STS-86 S/MM-07 FLIGHT READINESS REVIEW

NETWORKS



AGENDA

- SIGNIFICANT CHANGES
- MIR COMM CAPABILITIES
- CONFIGURATION MANAGEMENT
- CRITICAL PERIODS
- READINESS CERTIFICATION

GARY A. MORSE
GSFC/NETWORKS
SEPTEMBER 1997

SIGNIFICANT CHANGES

- GROUND NETWORK -- MIL/PDL/DFRC
  - INSTALLATION OF MBR DQM CAPABILITY AT MIL/PDL
  - MIL REPLACED THE UHF TELTRAC ANALOG CONTROL CONSOLE WITH A DIGITAL CONTROL CONSOLE
  - MIL STAFF REDUCTIONS WILL HAVE NO IMPACT TO SHUTTLE OPERATIONS:
    - DELETION OF THE THIRD SHIFT OPERATION (M-F)
    - REDUCTION OF THE SECOND SHIFT TO A SINGLE LINK OPERATION (M-F)
  - DFRC - UPGRADE OF ATF-1 ANTENNA FROM 6 METER TO 7 METER
- C-BAND RADAR
  - ASTC SCHEDULED DOWN FOR RELOCATION JUNE 1997 TO JUNE 1998

SIGNIFICANT CHANGES (CONT)

- FLIGHT DYNAMICS FACILITY
  - UNIX WORKSTATIONS TO BE USED FOR LAUNCH TO LANDING
    - IBM MAINFRAMES HAVE BEEN DEACTIVATED
- NASA INTEGRATED SUPPORT NETWORK (NISN)
  - MESSAGE SWITCHING SYSTEM (MSS) WILL BE PRIME FOR THIS MISSION
  - INTERNET PROTOCOL (IP) WILL BE USED IN A SHADOW MODE TO CONTINUE CHARACTERIZATION OF ROUTER ANOMALIES
  - ROUTER SOFTWARE DELIVERY ANTICIPATED IN SEPTEMBER

ROUTER FIX SCENARIOS

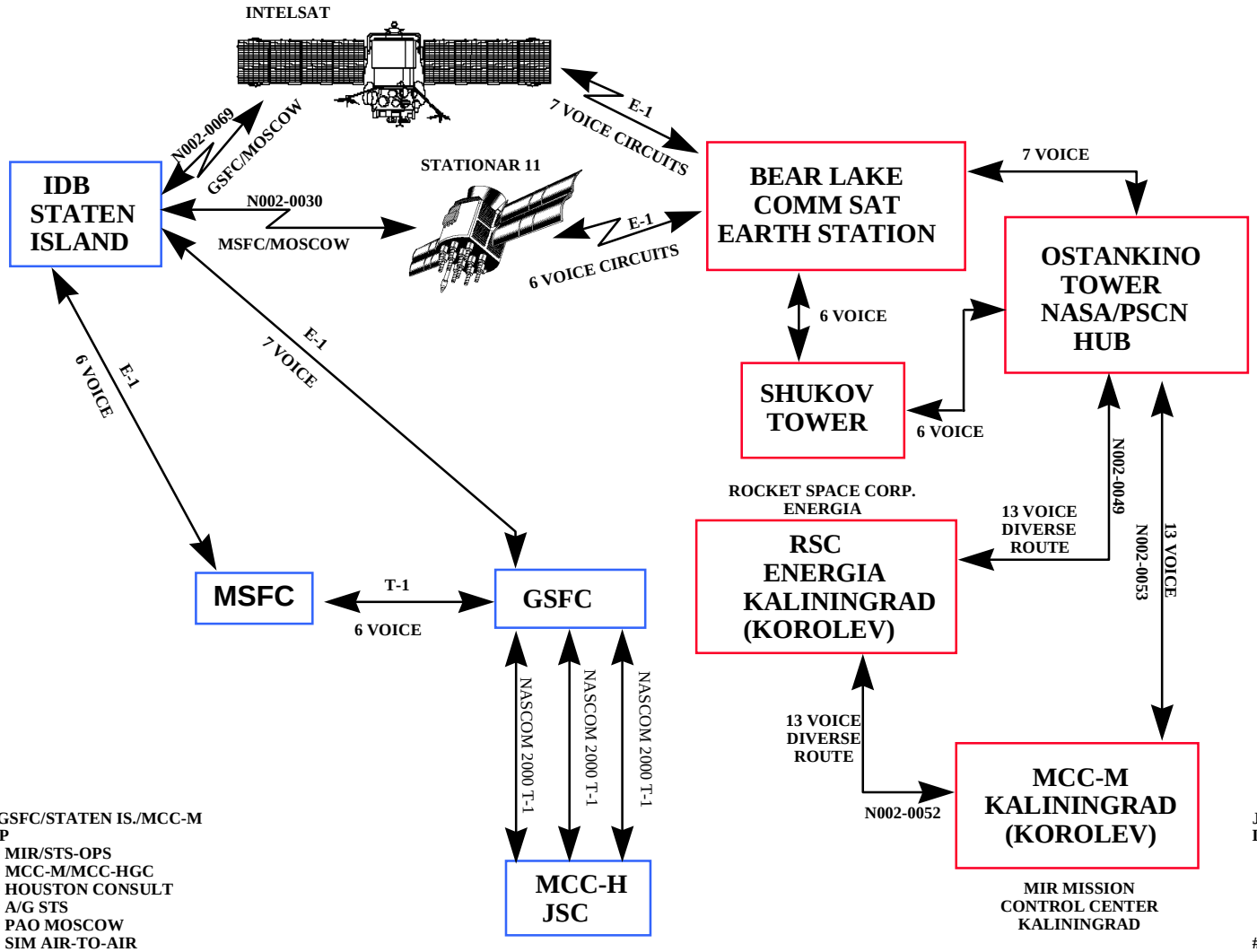
- IF BAY DELIVERS SOFTWARE WITH FIXES BEFORE THE STS-86 VER/VAL TEST
  - LAUNCH WITH IP TRANSITION IN PURE SHADOW MODE
  - SCHEDULE SITES TO GO IP PRIME DURING NON-CRITICAL PERIODS
  - CONFIGURE OFF-LINE DEMUX AT JSC TO IP DURING NON-CRITICAL PERIODS
- IF BAY DOESN’T DELIVER SOFTWARE WITH FIXES BEFORE THE STS-86 VER/VAL TEST
  - LAUNCH WITH IP TRANSITION IN PURE SHADOW MODE
  - MONITOR DATA FLOWS AND COLLECT DATA FOR PROBLEM RESOLUTION

MO&DS DIRECTORATE

CODE 500

STS-86 S/MM-07 NETWORKS

JSC - KOROLEV (KALININGRAD) VOICE CIRCUITS



JSC/GSFC/STATEN IS./MCC-M LOOP
#1 = MIR/STS-OPS
#3 = MCC-M/MCC-HGC
#8 = HOUSTON CONSULT
#9 = A/G STS
#11 = PAO MOSCOW
#12 = SIM AIR-TO-AIR
#13 = A/G-1 (MON TO MOSCOW)

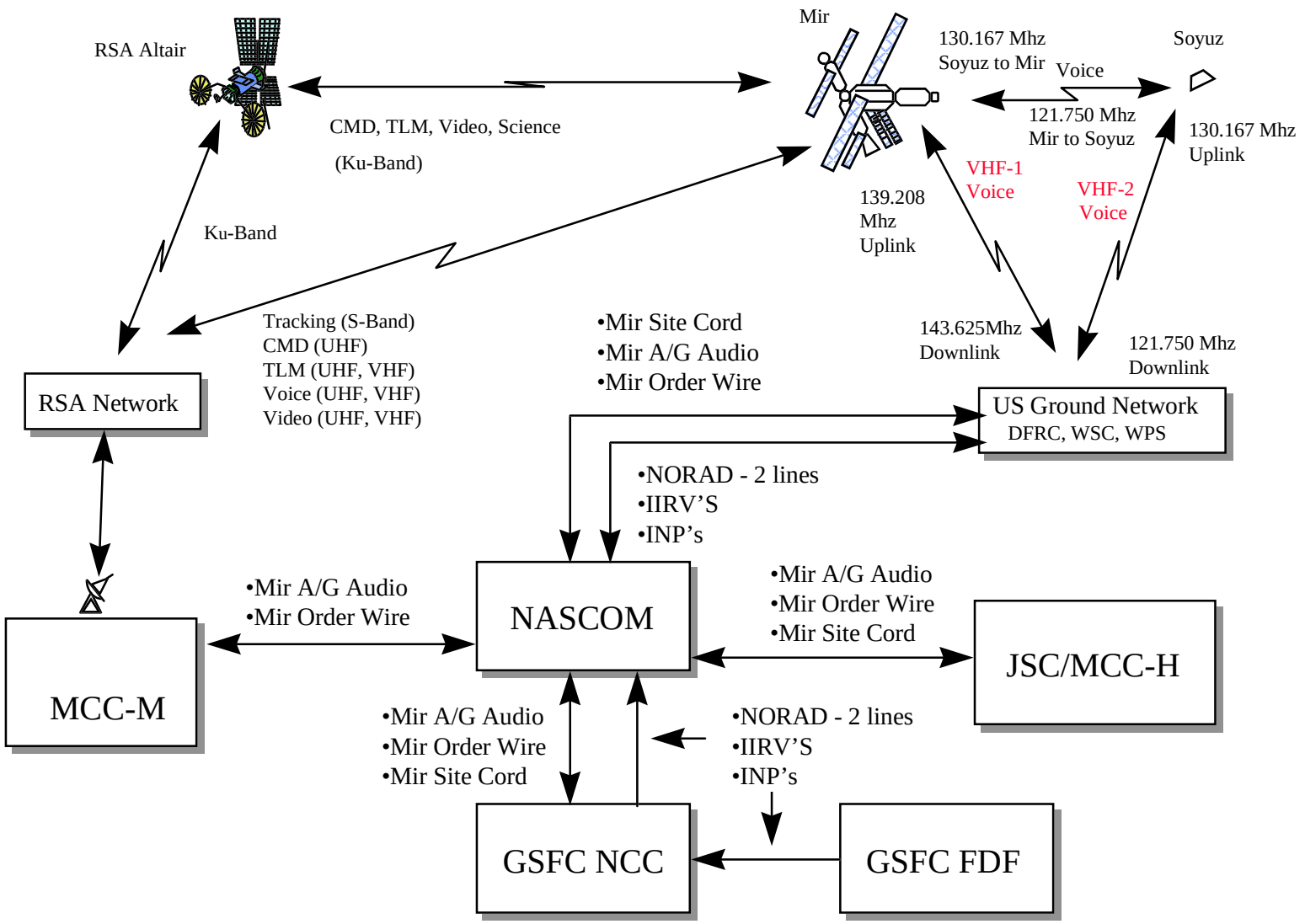
JSC/GSFC/STATEN ISLAND/MCC-M LOOP
#2 - A/G MIR
#4 = FLT DIR MCC-H
#5 = FLT DIR MCC-M
#6 = MIR SIM COOR/MIR PA
#7 = MOSCOW CONSULT
#10 = ASTRONAUT SURGEON

MO&DS DIRECTORATE

CODE 500

STS-86 S/MM-07 NETWORKS

MIR COMMUNICATIONS OVERVIEW



CONFIGURATION MANAGEMENT

- HARDWARE/SOFTWARE FREEZE
  - INTEGRATED NETWORKS FREEZE WILL BE IMPOSED AT LAUNCH MINUS 14 DAYS
  - EXEMPTIONS ARE APPROVED BY THE NETWORK DIRECTOR AND APPROPRIATE DIVISION CHIEFS
- CRITICAL PERIODS
  - CRITICAL PERIODS HAVE BEEN IDENTIFIED
  - MAINTENANCE AND TESTING RESTRICTIONS APPLY

SPACE SHUTTLE CRITICAL PERIODS

EVENT	*START*	*STOP*
LAUNCH RENDEZVOUS MISSION	LAUNCH -4 HOURS	LAST RENDEZVOUS BURN ON FD1
LAUNCH NON-RENDEZVOUS MISSION	LAUNCH -4 HOURS	"GO FOR ORBIT OPS"
PAYLOAD DEPLOY	DEPLOY -3 HOURS	FINAL SEP BURN (+1 ORBIT DELAY)
RENDEZVOUS/DOCKING	2 HOURS PRIOR TO FIRST DAY OF RENDEZVOUS BURN (~CREW WAKEUP)	HATCH OPENING (+1 ORBIT DELAY FOR CONTINGENCY)
RENDEZVOUS GRAPPLE/RETRIEVE	2 HOURS PRIOR TO FIRST DAY OF RENDEZVOUS BURN (~CREW WAKEUP)	PAYLOAD BERTHING (+1 ORBIT DELAY FOR CONTINGENCY)
UNDOCKING	UNDOCKING - 3 HOURS	FINAL SEP BURN (+1 ORBIT DELAY)
EVA	EVA EGRESS - 1 HOUR	EVA INGRESS + 1 HOUR
LANDING	TD - 5 HOURS	WOW

GODDARD SPACE FLIGHT CENTER

CERTIFICATE OF MISSION OPERATIONS AND DATA SYSTEMS DIRECTORATE (MO&DSD) NETWORKS READINESS

THIS IS TO CERTIFY THAT WITH SUCCESSFUL COMPLETION OF FLIGHT READINESS PREPARATIONS AND CLOSURE OF ASSOCIATED ACTION ITEMS, ALL MO&DSD ELEMENTS AND INTEGRATED NETWORKS ARE READY TO SUPPORT THE STS-86 S/MM-07/SPACEHAB-DM MISSION.

8/22/97	W A Watson 8/22/97	R. D Caldwell 8/22/97
G. A. MORSE/NASA DATE	W. WATSON/NASA DATE	for W. FRIEDMAN/ATSC DATE
SPACE SHUTTLE NETWORK DIRECTOR	ASSISTANT CHIEF NETWORKS DIVISION	VICE PRESIDENT GSFC PROGRAMS
8/22/97	8/22/97	8/22/97
JON Z. WALKER/NASA DATE	W. MACK/NASA DATE	R. STELMASZEK/NASA DATE
HEAD, INTEGRATION AND OPERATIONS MANAGEMENT	OFFICE OF FLIGHT ASSURANCE	HUMAN SPACE FLIGHT NETWORK SUPPORT MANAGER

STS-86 S/MM-07 NETWORKS

BACKUP

MO&DS DIRECTORATE

CODE 500

STS-86 S/MM-07
NETWORKS

FDF UNIX TRANSITION PROGRESS

MISSION	MISSION PHASE	PRIME SYSTEM	B/U SYSTEM	SHADOW
STS-83	LAUNCH	F1	F2	UNIX
	ON-ORBIT	F1	F2	UNIX
APRIL 1997	LANDING	F1	F2	UNIX
STS-84	LAUNCH	F1	F2	UNIX
	ON-ORBIT	F1	F2	UNIX
MAY 1997	LANDING	F1	F2	UNIX
STS-94	LAUNCH	F1	F2	UNIX
	ON-ORBIT	UNIX	F1	N/A
JULY 1997	LANDING	F1/SN UNIX/GN	F2	N/A
STS-85	LAUNCH	UNIX	F1	UNIX
	ON-ORBIT	UNIX	F1	UNIX
AUGUST 1997	LANDING	UNIX	F1	UNIX
STS-86	LAUNCH	UNIX	UNIX	N/A
	ON-ORBIT	UNIX	UNIX	N/A
PROJECTED CONFIGURATION	LANDING	UNIX	UNIX	N/A

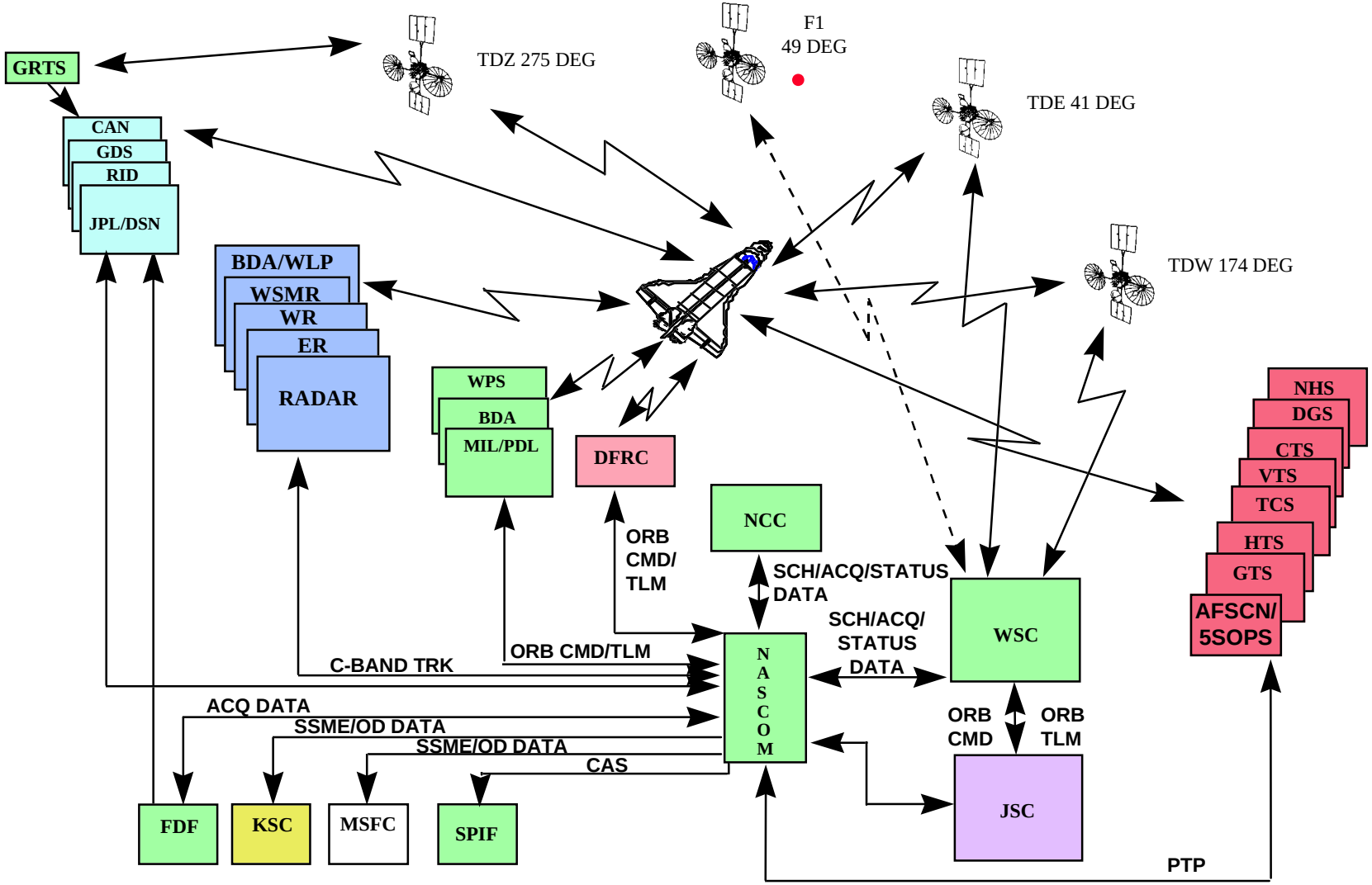
F1/F2 - IBM MAINFRAMES
UNIX - HP WORKSTATIONS

MO&DS DIRECTORATE

CODE 500

STS-86 S/MM-07 NETWORKS

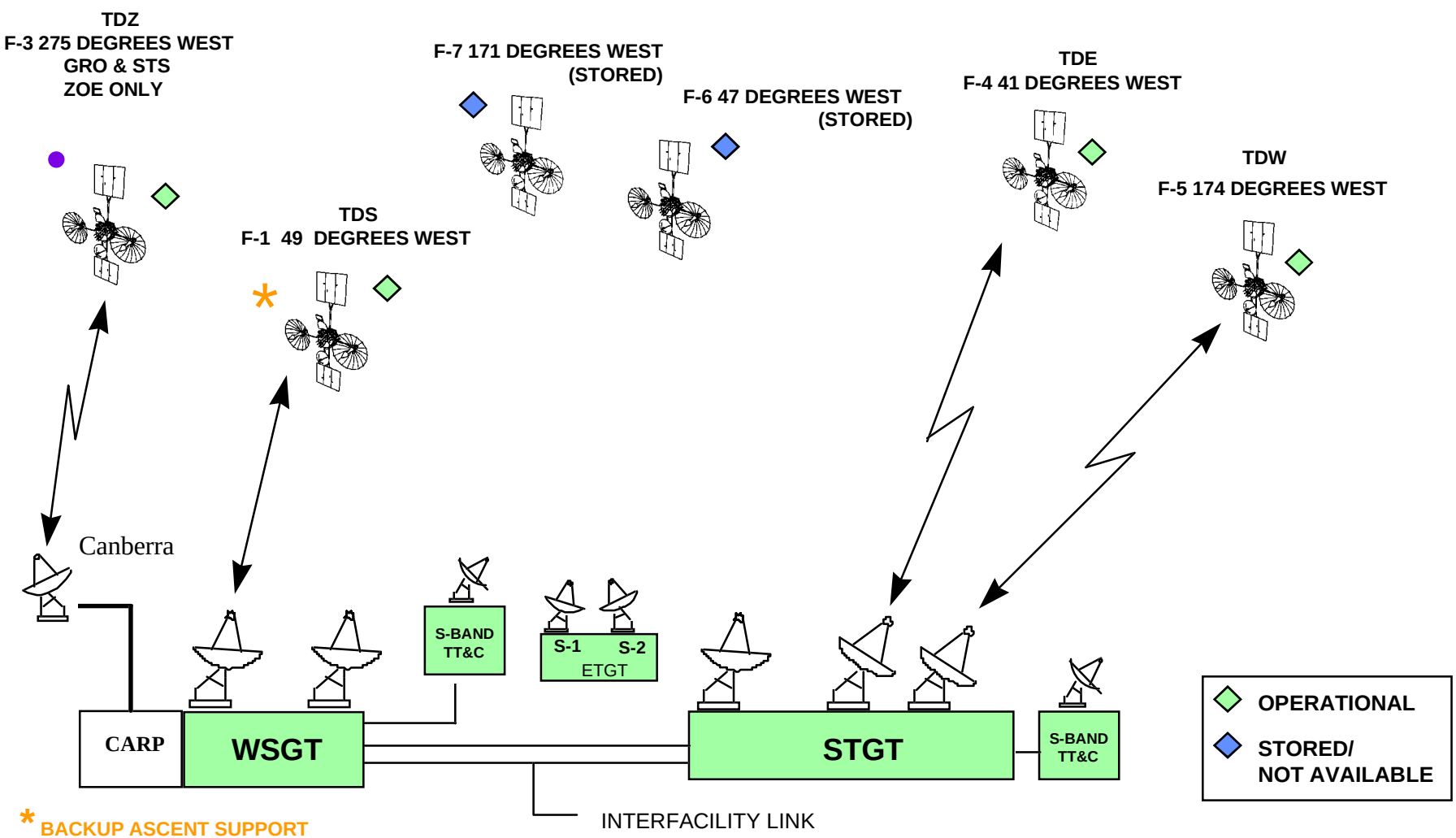
STS-86 INTEGRATED NETWORK



● BACKUP FOR ASCENT SUPPORT

MO&DS DIRECTORATE	STS-86 S/MM-07 NETWORKS
CODE 500	

TDRSS CONSTELLATION

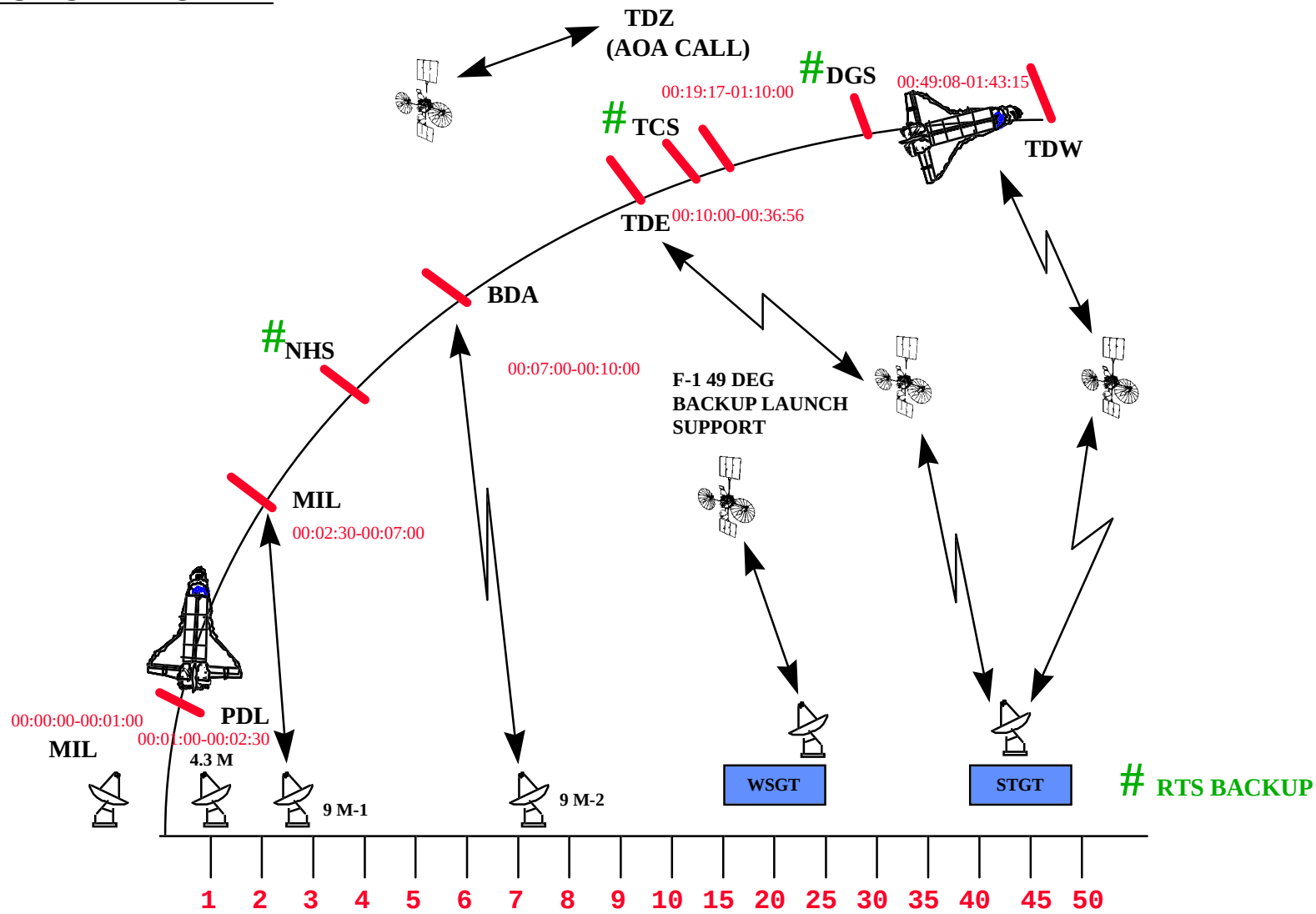


* BACKUP ASCENT SUPPORT

• AVAILABLE ON-ORBIT AT INCO DISCRETION

MO&DS DIRECTORATE	STS-86 S/MM-07 NETWORKS
CODE 500	

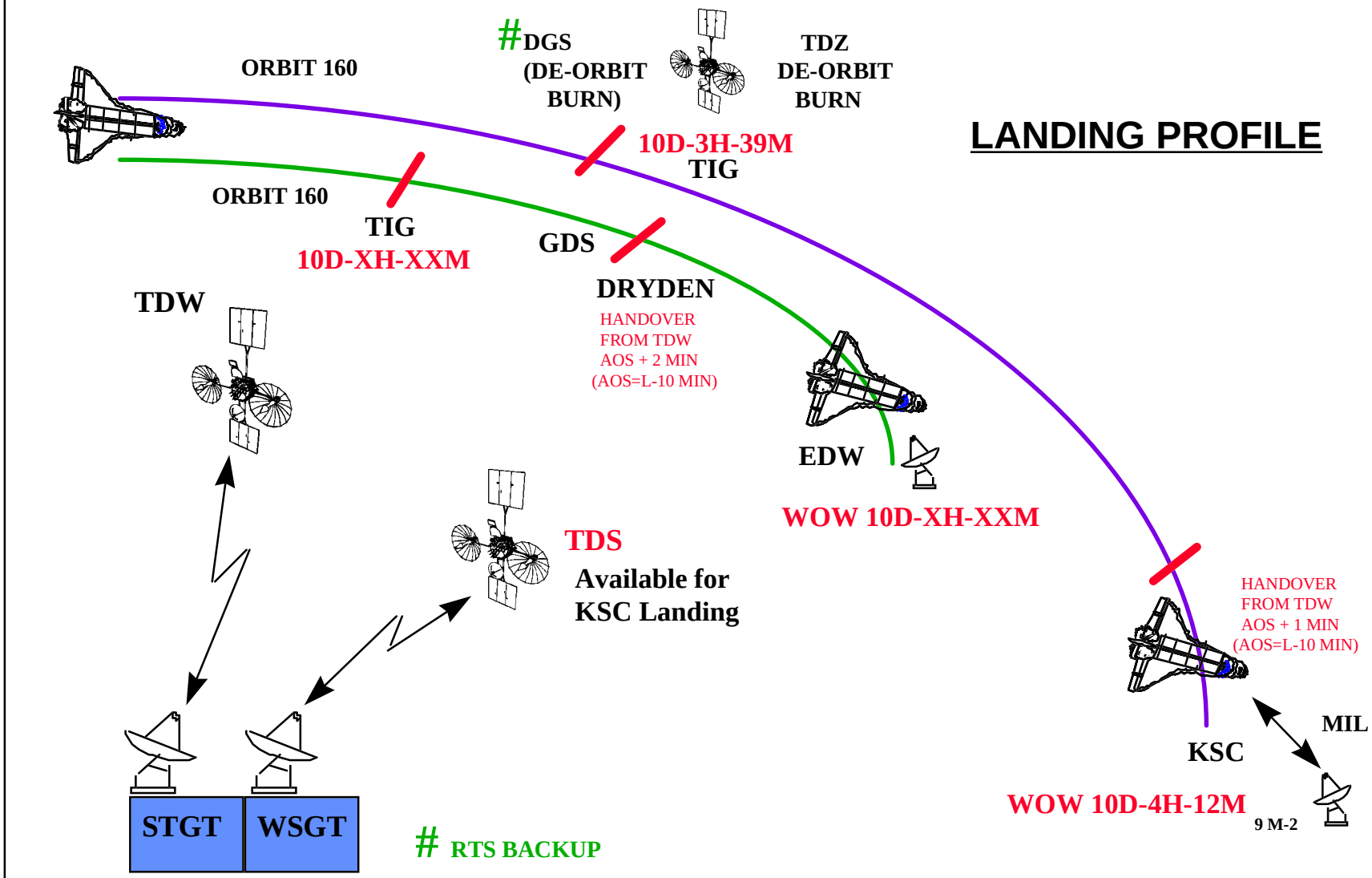
LAUNCH PROFILE



MO&DS DIRECTORATE

CODE 500

STS-86 S/MM-07 NETWORKS



MO&DS DIRECTORATE	STS-86 S/MM-07 NETWORKS
CODE 500	

JSC - KALININGRAD VOICE CIRCUITS

1. MIR SHUTTLE OPS CH-1
2. A/G MIR CH-2
3. MCC-M/MCC-H GC CH-3
4. FLIGHT DIRECTOR MCC-H CH-4
5. FLIGHT DIRECTOR MCC-M CH-5
6. MIR SIM COORD/MIR P/I CH-6
7. MOSCOW CONSULT CH-7
8. HOUSTON CONSULT CH-8
9. A/G STS CH-9
10. ASTRONAUT SURGEON CH-10
11. PAO MOSCOW CH-11
12. SIM AIR-TO-AIR (JIS ONLY) CH-12
13. VHF SPARE CH-13
14. MCC-M/MCC-H GSOC BACK UP #1 (MIR SHUTTLE OPS)
15. MCC-M/MCC-H GSOC BACK UP #2 (A/G MIR)

MO&DS DIRECTORATE	STS-86 S/MM-07 NETWORKS
CODE 500	

MIR COMMUNICATIONS OVERVIEW

	MIR VHF-1 (Routine support) 139.208 Mhz up 143.625Mhz down Full duplex w doppler comp - All stations VMR-500 voice recognition on transmit	SOYUZ VHF-2 (Contingency support) 130.167 Mhz up 121.750 Mhz down Full duplex -All stations Uplink transmit for emergency support only
DFRC	Quad Yagi prime/Dual Yagi backup ICOM 820 receive w 30 Khz B/W prime ICOM-820 receive w 30 Khz B/W backup ICOM-820 (2) transmit; constant key Power Amps TE-1512G 10 KHz deviation;160 watts Antenna Controller/Nova S/W	Quad Yagi prime/dual Yagi B/U ICOM R-9000 receive w 15 Khz B/W prime HP-8657 w FM Modulator for transmit Power Amp TE-1212GS 10 KHz deviation; 150 watts Antenna Controller/Nova S/W INP's for C-band (Manual backup pointing)
WSC	Single Quad Yagi array; no backup Dual transmit/receive strings w RF switch ICOM-821 (2) receive w 15 Khz B/W ICOM-821 (2) transmit Power Amps TE-1512G 10 KHz deviation; 160 watts Antenna controller/FOD Track S/W	Single Yagi (No backup) Single transmit/receive string ICOM R-9000 receive w 15 Khz B/W HP-8920 w FM modulator transmit Power Amp TE1509G 10 Khz deviation; 150 watts Antenna Controller/FOD Track S/W
WPS	Quad Yagi prime (Single array) Single transmit/receive string Single Yagi backup (Original system) ICOM 821 Prime receive/30Khz B/W ICOM 820 B/U receive/15 Khz B/W ICOM-821 Prime/820 B/U transmit; constant key; Power Amps TE1512G prime/1510G backup 10 KHz deviation; 160 watts Antenna controller prime/FOD Track S/W Backup Yagi STPS /IIRV's (Dish rim mount)	Single Yagi - Collocated with VHF-1 Single Yagi No Backup ICOM 9000 Receive w 15 Khz B/W HP-8660 w FM modulator for transmit Power Amp TE-1212GS 10 Khz deviation; 130 watts STPS/IIRV's (Dish rim mount)

STS-85 NETWORKS ACTIVITIES

- ACCOMPLISHMENTS
  - CONTINUED MIL MBR ENGINEERING/EVALUATION SUPPORT
  - BDA/PDL SUPPORTED ALL DATA RECORDING REQUIREMENTS UTILIZING THE MBR DRS EQUIPMENT AS PRIME.
  - DFRC ATF-1 (NEW UPLINK CAPABILITY) ENGINEERING CHECKOUT
  - DSN/CAN SUCCESSFULLY SUPPORTED ONE PROFICIENCY PASS
  - IP ROUTER MONITORING CONTINUED AT GSFC TO CHARACTERIZE ROUTER PERFORMANCE AND PRIOR FAILURE MODES