



# MISSION OPERATIONS AND DATA SYSTEMS DIRECTORATE



## STS-85 CRISTA/SPAS-02 FLIGHT READINESS REVIEW

## AGENDA

### NETWORKS



- STS-94 NETWORKS ACTIVITIES
- STS-94 ANOMALIES
- LAUNCH PROFILE
- SIGNIFICANT CHANGES
- DUAL HITCHHIKER DATA STREAM FLOW
- CONFIGURATION MANAGEMENT
- CRITICAL PERIODS
- READINESS CERTIFICATION

GARY A. MORSE  
GSFC/NETWORKS  
JULY 1997

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**STS-85 CRISTA/SPAS-02  
NETWORKS**



**CODE 500**

## **STS-94 NETWORKS ACTIVITIES**

- **ACCOMPLISHMENTS**
  - **SUPPORTED MIL/PDL/BDA MBR DIGITAL RECORDING SYSTEM TESTS**
  - **SUCCESSFULLY RECORDED 1 MB SPACELAB CONTINGENCY DOWNLINK ON THE MBR/DRS EQUIPMENT AT MIL**
  - **SUCCESSFUL DRYDEN (ATF-1) ON-ORBIT TWO- WAY ENGINEERING PASSES**
    - **CONFIRMED BACKUP UPLINK CAPABILITY**
  - **FDF UNIX WORKSTATION ENVIRONMENT SUCCESSFULLY CHECKED OUT ON-ORBIT AND USED FOR LANDING**
    - **F-2 DEACTIVATION PLANNED - TBD**

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## **STS-94 ANOMALIES**

- **IP ROUTER**
  - **NISN EXPERIENCED IP ROUTER PROBLEMS DURING PRELAUNCH AND ON-ORBIT ACTIVITIES**
  - **REVERTED TO MESSAGE SWITCHING SYSTEM (MSS)**
  - **PROBLEM IS BEING REVIEWED BY “BAY NETWORKS”**
    - **DISCONNECT BETWEEN TWO PROTOCOLS**
      - **INTERNET GROUP MANAGEMENT PROTOCOL (IGMP)**
      - **MULTI-CAST OPEN SHORTEST PATH FIRST (MOSPF)**
  - **NO FURTHER IMPLEMENTATION OR TEST ACTIVITY PLANNED UNTIL THE ROUTER SOFTWARE FAILURE MODE IS UNDERSTOOD AND CORRECTED**

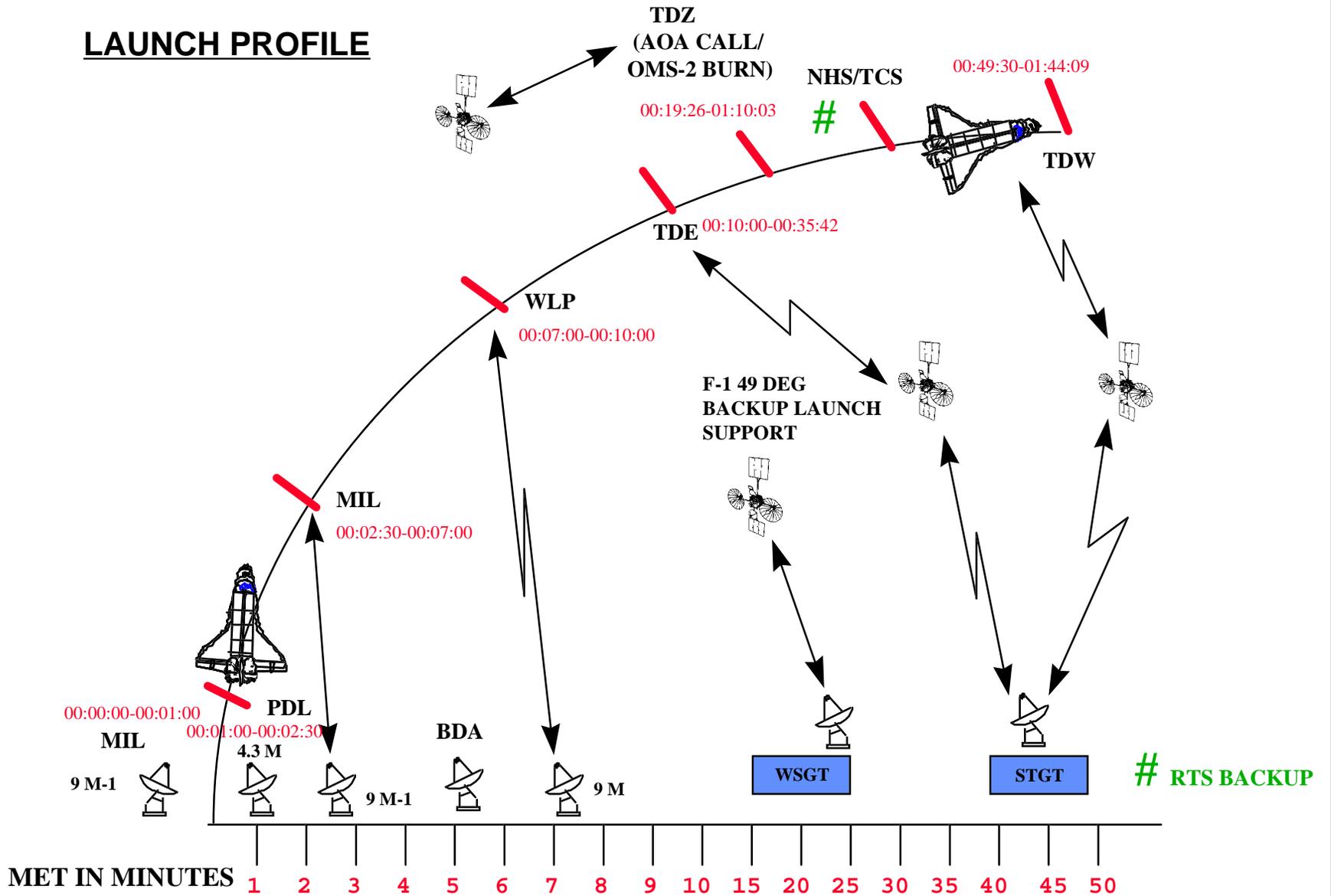
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## LAUNCH PROFILE



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NETWORKS****CODE 500****SIGNIFICANT CHANGES**

- **GROUND NETWORK**
  - **PDL/BDA - MBR OPERATIONAL FOR THIS MISSION**
  - **MIL - MBR EQUIPMENT INSTALLED, CHECKOUT CONTINUES**
- **GOLDSTONE (GDS)**
  - **COMMAND MATRIX SWITCH REPLACED WITH A MANUAL PATCH PANEL - JULY 17, 1997 (STS-94 WOW), ESTIMATED COMPLETION BY JULY 25, 1997**
- **C-BAND RADAR**
  - **ASTC SCHEDULED DOWN FOR RELOCATION JUNE 1997 TO JUNE 1998**
  - **VDHC SCHEDULED DOWN FOR DLM JULY 22 - AUGUST 6, 1997**
- **WHITE SANDS COMPLEX**
  - **SOFTWARE 97004A - TEST SOFTWARE TO BE DELIVERED TO CARP (TDZ) SYSTEM ONLY ON JULY 22, 1997**

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NETWORKS****CODE 500****SIGNIFICANT CHANGES (CONT)**

- **NASA INTEGRATED SUPPORT NETWORK (NISN)**
  - **HYBRID IP CONFIGURATION CONTINUES - GSFC/NCC AND FDF ONLY**
  - **MESSAGE SWITCHING SYSTEM (MSS) WILL BE USED BY ALL OTHER CENTERS AND GROUND SITES**
  - **WSC MODIFIED MDM/IP DATA EVALUATION AT JSC**
    - **DEPENDENT UPON MDM FIRMWARE (REVISION E) AND ROUTER ANOMALY RESOLUTION**
  - **DUAL SIMULTANEOUS 2 MB DATA STREAMS TO IEH-02/TAS-01 HITCHHIKER POCCS LOCATED AT GSFC**

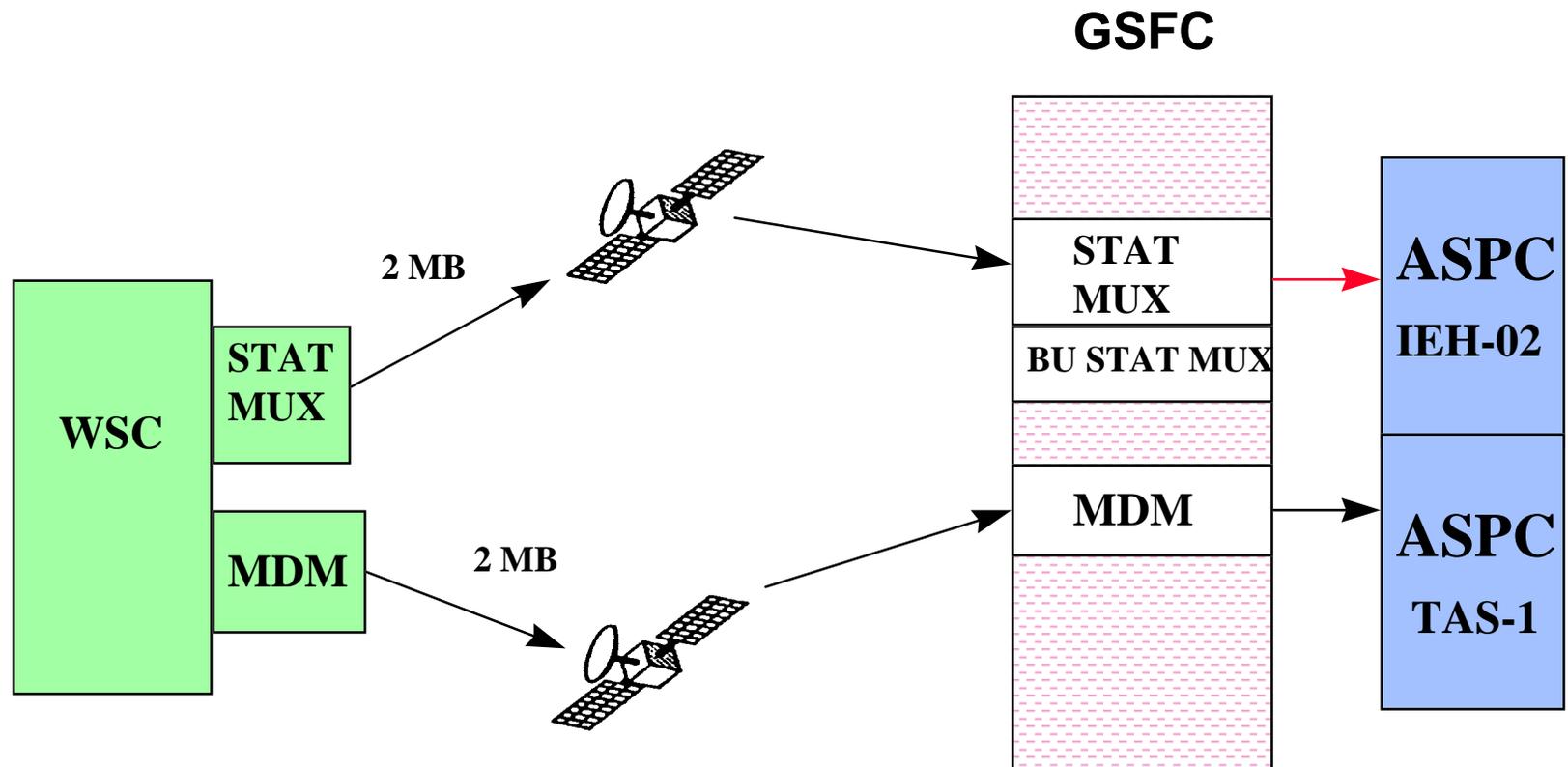
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## DUAL HITCHHIKER DATA STREAM FLOW



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## **CONFIGURATION MANAGEMENT**

- **HARDWARE/SOFTWARE FREEZE**
  - **INTEGRATED NETWORKS FREEZE WILL BE IMPOSED AT LAUNCH MINUS 7 DAYS**
  - **EXEMPTIONS ARE APPROVED BY THE NETWORK DIRECTOR AND APPROPRIATE DIVISION CHIEFS**
- **CRITICAL PERIODS**
  - **ORBITER AND PAYLOADS CRITICAL PERIODS HAVE BEEN IDENTIFIED**
  - **MAINTENANCE AND TESTING RESTRICTIONS APPLY**

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**SPACE SHUTTLE CRITICAL PERIODS**

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

# GODDARD SPACE FLIGHT CENTER

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

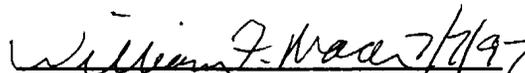
THIS IS TO CERTIFY THAT WITH SUCCESSFUL COMPLETION OF FLIGHT  
READINESS PREPARATIONS AND CLOSURE OF ASSOCIATED ACTION ITEMS, ALL  
MO&DSD ELEMENTS AND INTEGRATED NETWORKS ARE READY  
TO SUPPORT THE STS-85 CRISTA/SPAS-02 MISSION.

  
G. A. MORSE/NASA      7/7/97  
SPACE SHUTTLE  
NETWORK DIRECTOR

  
W. WATSON/NASA      7/7/97  
ASSISTANT CHIEF  
NETWORKS DIVISION

  
for W. FRIEDMAN/ATSC      7/7/97  
VICE PRESIDENT  
GSFC PROGRAMS

  
JON Z. WALKER/NASA      7/7/97  
HEAD, INTEGRATION AND  
OPERATIONS MANAGEMENT

  
W. MACK/NASA      7/7/97  
OFFICE OF FLIGHT  
ASSURANCE

  
R. STELMASZEK/NASA      7/7/97  
HUMAN SPACE FLIGHT  
NETWORK SUPPORT MANAGER

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**BACKUP**

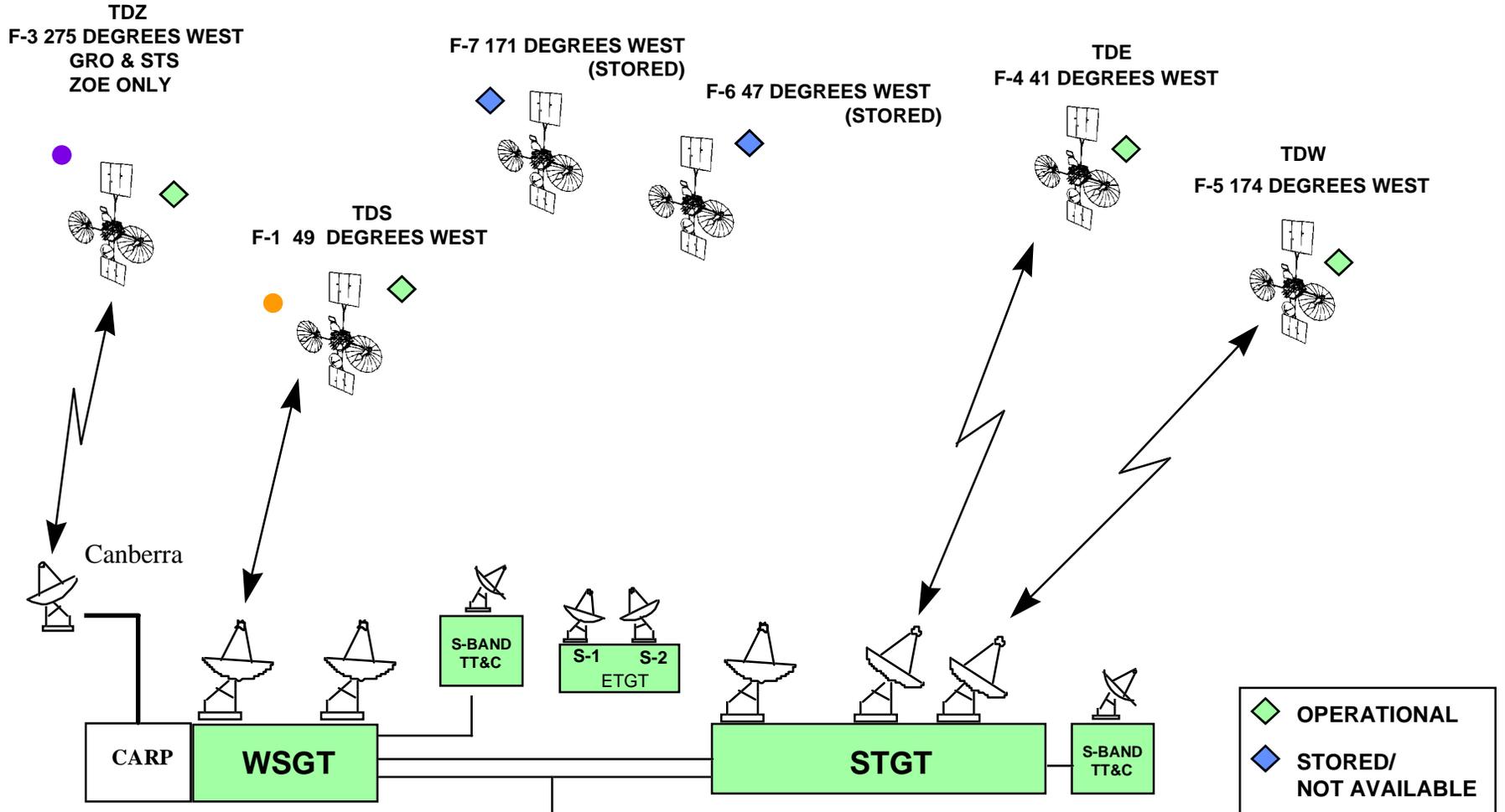
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**TDRSS CONSTELLATION**



• **BACKUP ASCENT SUPPORT**

• **AVAILABLE ON-ORBIT AT INCO DISCRETION**

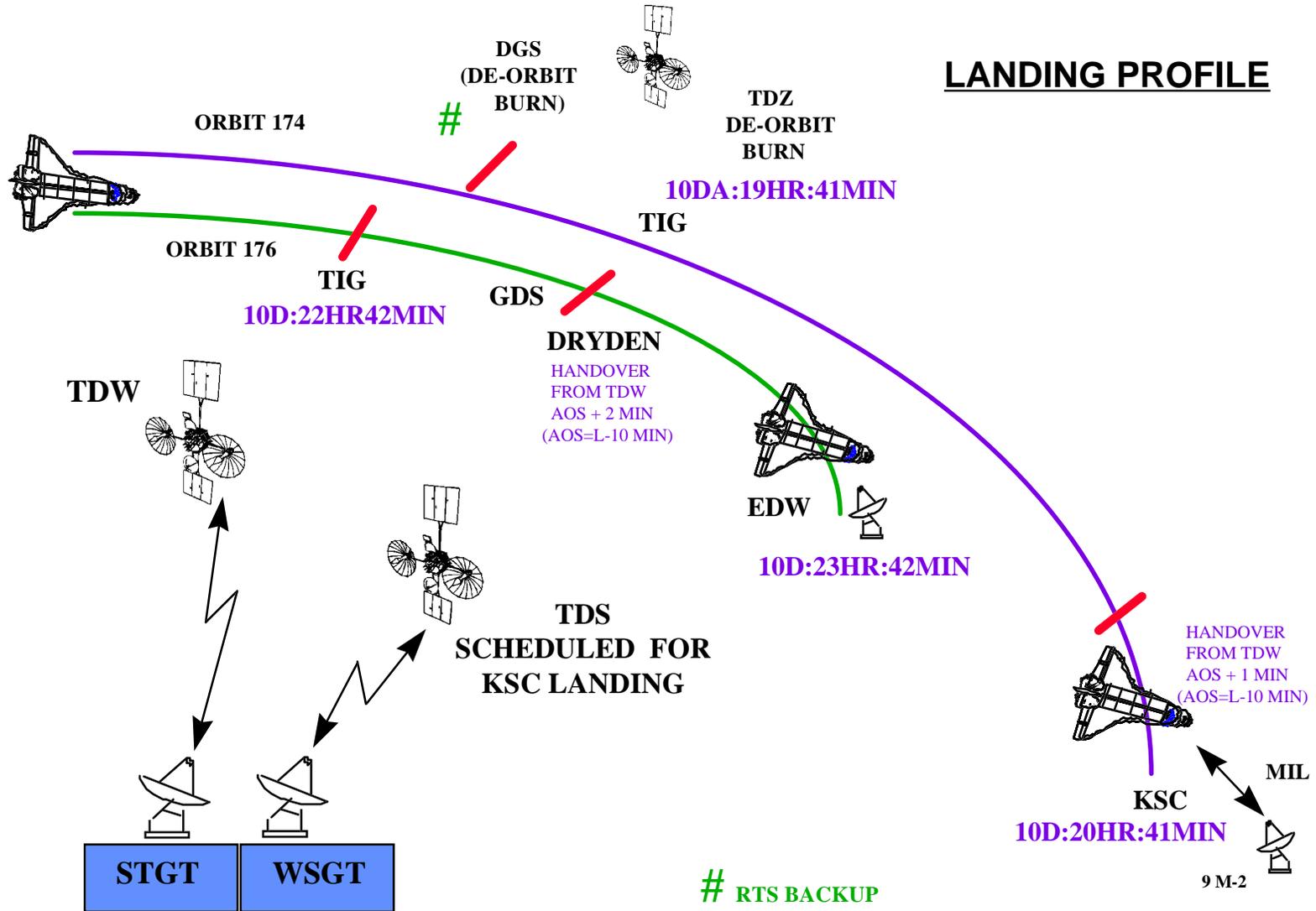
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## LANDING PROFILE



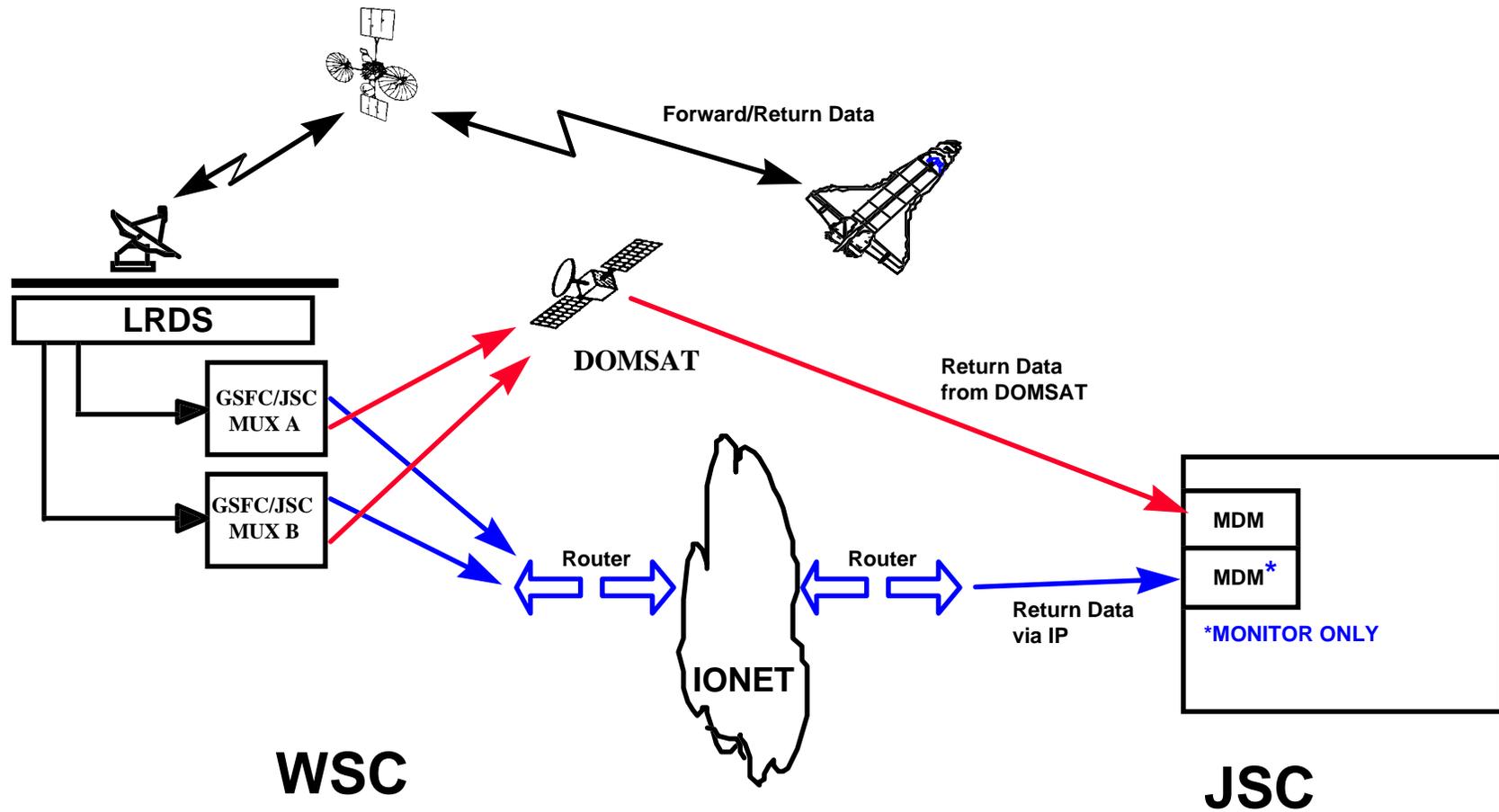
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## JSC RETURN IP DATA EVALUATION



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**CRITICAL AND HIGHLY DESIRABLE PERIODS**

Category			Event	K	Start	Stop
1	2	3				
x			Launch		L - 4 hours	00/01:40
	x		TAS/IEH Activation/commanding on and thermal stability/survival		00/02:40	00/03:05
x			SPAS Checkout and Deploy (plus one orbit delay)		00/03:25	00/03:07
		x	TPFLEX activation/deact to insure thermal stability (no crew insight)		00/05:35	00/05:55
	x		SPAS deploy through 7.5 hr for calibration and checkout		00/07:15	00/15:45
	x		Maneuver during crew sleep		00/15:40	00/15:55
	x		Maneuver during crew sleep		00/18:55	00/19:15
	x		SPAS experiment commanding/transitioning and verification		00/19:15	00/19:45
	x		Morning mail uplink for FD 2	x	00/19:30	00/20:00
	x		SPAS minimum comm period		00/19:45	00/23:45
	x		TPFLEX activation/deact to insure thermal stability (no crew insight)		00/22:30	00/23:10
	x		MFD live TV of crew operated robot arm for performance analysis		00/23:10	01/05:55
	x		SEH Solar Orbit		01/03:30	01/03:50
			PAO Event— CDR		01/03:30	01/03:50
x			SPAS experiment commanding/transitioning and verification		01/05:50	01/06:20
	x		SPAS minimum comm period		01/06:20	01/16:00
	x		Maneuver during crew sleep		01/15:55	01/16:10
	x		Morning mail uplink for FD 3	x	01/17:20	01/18:30
	x		PAO Event— PLT		01/20:55	01/21:15
x			SPAS experiment commanding/transitioning and verification		01/21:00	01/21:30
	x		SPAS minimum comm period		01/21:30	01/22:30
	x		TAS CVX experiment critical temperature determination period		02/03:00	02/15:00
x			SPAS experiment commanding/transitioning and verification		02/07:00	02/07:30
	x		SPAS minimum comm period		02/07:30	02/13:00
x			Maneuver during crew sleep		02/12:50	02/13:05
x			Maneuver during crew sleep		02/13:30	02/13:50
	x		SEH Solar Orbit		02/13:50	02/14:15
x			Maneuver during crew sleep		02/14:10	02/14:30
x			Maneuver during crew sleep		02/15:05	02/15:25
	x		SEH Solar Orbit		02/15:25	02/15:50
x			Maneuver during crew sleep		02/15:45	02/16:00
	x		Morning mail uplink for FD 4	x	02/16:00	02/16:30
x			SPAS experiment commanding/transitioning and verification		02/18:00	02/18:30
	x		SPAS minimum comm period		02/18:30	02/19:40
	x		PAO Event— MSI		02/19:40	02/20:00
	x		SEH Solar Orbit	#	02/19:55	02/20:25
	x		MFD live TV of crew operated robot arm for performance analysis		02/20:15	03/04:05
	x		SEH Solar Orbit		02/21:25	02/21:50
x			SPAS experiment commanding/transitioning and verification		02/22:05	02/22:35
	x		SPAS minimum comm period		02/22:35	03/01:10
x			SPAS experiment commanding/transitioning and verification		03/06:30	03/07:00
	x		SPAS minimum comm period		03/07:00	03/08:00
x			Maneuver during crew sleep		03/07:55	03/08:10
x			Maneuver during crew sleep		03/11:40	03/12:00
x			SPAS experiment commanding/transitioning and verification		03/12:00	03/13:00
x			Maneuver during crew sleep		03/12:55	03/13:05
x			Maneuver during crew sleep		03/13:30	03/13:45

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**CRITICAL AND HIGHLY DESIRABLE PERIODS (CONT)**

Category			Event	K	Start	Stop
1	2	3				
		x	SEH Solar Orbit #		03/13:50	03/14:15
	x		Maneuver during crew sleep		03/14:10	03/14:30
	x		Maneuver during crew sleep		03/15:15	03/15:40
		x	SEH Solar Orbit #		03/15:35	03/16:00
		x	Morning mail uplink for FD 5	x	03/16:00	03/16:30
	x		SPAS experiment commanding/transitioning and verification		03/16:15	03/16:45
		x	SPAS minimum comm period		03/16:45	03/19:30
	x		SPAS experiment commanding/transitioning and verification		03/21:45	03/22:15
		x	MFD live TV of crew operated robot arm for performance analysis		03/21:45	04/03:00
		x	PAO Event— MS2		03/22:05	03/22:25
		x	SPAS minimum comm period		03/22:15	04/01:00
		x	PAO Event— PS1		03/22:25	03/22:45
	x		IEH SEH Coordinated science with launch and orbiting vehicles		04/03:10	04/04:15
		x	Private Family Conference— CDR	x	04/04:00	04/04:15
	x		SPAS experiment commanding/transitioning and verification		04/06:30	04/07:00
		x	SPAS minimum comm period		04/07:00	04/08:00
	x		Maneuver during crew sleep		04/07:55	04/08:10
	x		Maneuver during crew sleep		04/11:40	04/11:55
	x		SPAS experiment commanding/transitioning and verification		04/12:00	04/13:00
	x		Maneuver during crew sleep		04/12:55	04/13:10
	x		Maneuver during crew sleep		04/13:45	04/14:05
		x	SEH Solar Orbit #		04/14:05	04/14:20
	x		Maneuver during crew sleep		04/14:15	04/14:35
		x	Morning mail uplink for FD 6	x	04/15:00	04/15:30
	x		SPAS experiment commanding/transitioning and verification		04/17:15	04/17:45
		x	SPAS minimum comm period		04/17:45	04/18:40
	x		SPAS experiment commanding/transitioning and verification		04/22:20	04/22:50
		x	SPAS minimum comm period		04/22:50	05/01:30
		x	PAO Event— PS1		05/01:45	05/03:25
		x	SEH Solar Orbit #		05/02:30	05/03:10
		x	PAO Event— MS3		05/03:25	05/03:45
	x		SPAS experiment commanding/transitioning and verification		05/03:30	05/04:00
		x	SPAS minimum comm period		05/04:00	05/06:45
		x	Private Family Conference— PLT	x	05/05:45	05/06:00
	x		Maneuver during crew sleep		05/10:10	05/10:25
	x		SPAS experiment commanding/transitioning and verification		05/10:30	05/11:30
	x		Maneuver during crew sleep		05/11:40	05/11:55
		x	Morning mail uplink for FD 7	x	05/15:15	05/15:45
	x		SPAS experiment commanding/transitioning and verification		05/16:00	05/16:30
		x	SPAS minimum comm period		05/16:30	05/18:00
		x	MFD Ground Commanded Experiment requires Ku forward/return link.	x	05/18:15	06/00:00
		x	PAO Event— CDR		05/19:00	05/19:20
	x		SPAS experiment commanding/transitioning and verification		05/20:00	05/20:30
		x	SPAS minimum comm period		05/20:30	06/00:00
		x	SEH Solar Orbit #		06/01:10	06/01:25
		x	Private Family Conference— MS1	x	06/03:45	06/04:00
	x		SPAS experiment commanding/transitioning and verification		06/05:30	06/06:00

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**CRITICAL AND HIGHLY DESIRABLE PERIODS (CONT)**

C a t e g o r y			E v e n t	K	S t a r t	S t o p
1	2	3				
		x	SPAS minimum comm period		06/06:00	06/07:00
	x		Maneuver during crew sleep		06/06:55	06/07:10
	x		Maneuver during crew sleep		06/11:25	06/11:40
	x		SPAS experiment commanding/transitioning and verification		06/11:45	06/12:45
	x		Maneuver during crew sleep		06/12:50	06/13:10
		x	SEH Solar Orbit		06/14:20	06/14:45
	x		Morning mail uplink for FD 8	x	06/14:25	06/14:55
		x	SEH Solar Orbit		06/15:50	06/16:25
	x		SPAS experiment commanding/transitioning and verification		06/16:40	06/17:10
	x		SPAS minimum comm period		06/17:10	06/19:10
		x	PAO Event— PLT		06/18:10	06/18:30
	x		SPAS experiment commanding/transitioning and verification		06/22:35	06/23:05
	x		SPAS minimum comm period		06/23:50	07/00:45
		x	Private Family Conference— MS2	x	07/02:55	07/03:10
	x		Maneuver during crew sleep		07/05:10	07/05:25
	x		SPAS experiment commanding/transitioning and verification		07/05:30	07/06:00
		x	SPAS minimum comm period		07/06:00	07/07:00
	x		Maneuver during crew sleep		07/06:55	07/07:10
	x		Maneuver during crew sleep		07/11:10	07/11:25
	x		SPAS experiment commanding/transitioning and verification		07/11:30	07/13:00
	x		Maneuver during crew sleep		07/12:55	07/13:15
		x	Morning mail uplink for FD 9	x	07/14:25	07/14:55
	x		SPAS experiment commanding/transitioning and verification		07/17:30	07/18:00
		x	SPAS minimum comm period		07/18:00	07/19:15
		x	PAO Event— Crew Conference		07/18:15	07/18:45
	x		SPAS experiment commanding/transitioning and verification		07/22:40	07/23:10
		x	SPAS minimum comm period		07/23:10	08/01:00
		x	TAS CVX experiment critical temperature determination period		08/02:00	08/14:00
		x	Private Family Conference— MS3	x	08/02:15	08/02:30
	x		SPAS experiment commanding/transitioning and verification		08/05:00	08/05:30
		x	SPAS minimum comm period		08/05:30	08/13:30
		x	Morning mail uplink for FD 10	x	08/13:00	08/13:30
		x	SEH Solar Orbit #		08/14:25	08/14:45
	x		SPAS experiment commanding/transitioning and verification		08/18:00	08/18:30
x			SPAS Rendezvous/Grapple/Berthing (plus one orbit delay)		08/17:19	09/03:00
		x	Private Family Conference— PS1	x	09/03:20	09/03:35
	x		Maneuver during crew sleep		09/05:30	09/05:50
	x		Maneuver during crew sleep		09/06:15	09/06:40
		x	SEH Solar Orbit		09/06:35	09/07:00
	x		Maneuver during crew sleep		09/06:55	09/07:15
	x		Maneuver during crew sleep		09/08:10	09/08:30
		x	SEH Solar Orbit		09/08:25	09/08:45
	x		Maneuver during crew sleep		09/08:40	09/09:00
	x		Maneuver during crew sleep		09/09:50	09/10:10
		x	SEH Solar Orbit		09/10:05	09/10:20
	x		Maneuver during crew sleep		09/10:15	09/10:35
		x	Morning mail uplink for FD 11	x	09/13:20	09/14:00

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**CRITICAL AND HIGHLY DESIRABLE PERIODS (CONT)**

Category			Event	K	Start	Stop
1	2	3				
	x		FCS C/O		09/15:30	09/17:00
	x		Orbit Adjust Burns for ISIR High Resolution Science		09/20:40	09/21:55
	x		Orbit Adjust Burn		09/20:55	09/21:15
	x		Orbit Adjust Burn		09/21:40	09/22:00
	x		TAS ISIR High Resolution Science minimum requirement		09/23:20	10/03:30
	x		Maneuver during crew sleep		10/04:30	10/05:05
	x		Maneuver during crew sleep		10/05:15	10/05:50
	x		Maneuver during crew sleep		10/06:00	10/06:30
	x		Maneuver during crew sleep		10/06:40	10/07:15
	x		Maneuver during crew sleep		10/07:25	10/08:00
	x		Maneuver during crew sleep		10/08:10	10/08:45
	x		Maneuver during crew sleep		10/09:00	10/09:30
	x		Maneuver during crew sleep		10/09:45	10/10:15
x			Deorbit Prep/Landing		10/15:24	10/20:24
x			Category 1 = Shuttle Critical			
	x		Category 2 = Payload Critical			
		x	Category 3= Highly Desirable			
			K-band forward link required	x		
			TDRS-Z support requested to fill in TDRS ZOE's for SEH on IEH-02. The SEH instrument relies on Ku band data downlink for science and has no onboard recording capability.			

#