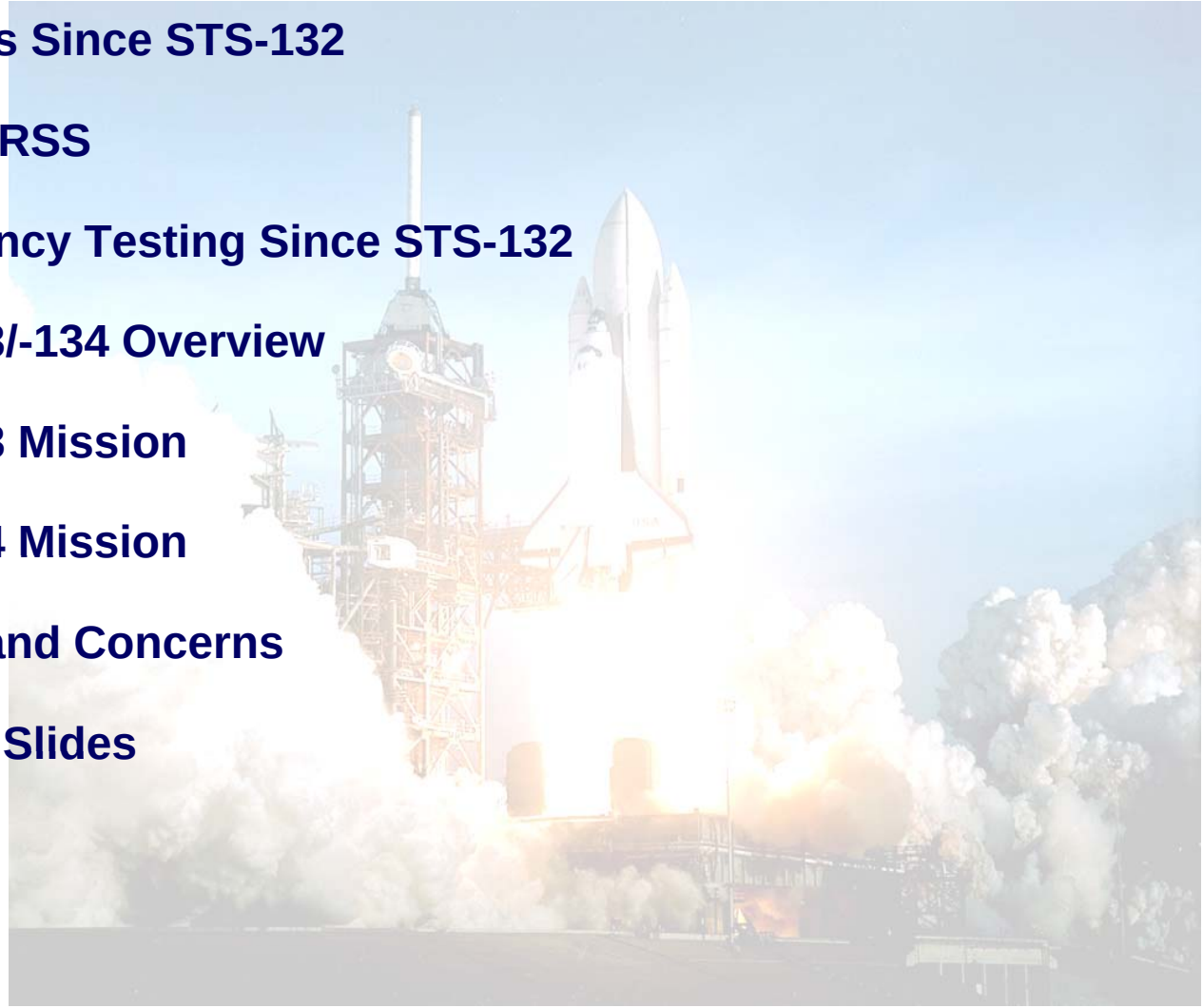
STS-133/134 Mission Planning Splinter Meeting Integrated Networks Status

09/14/10

Erik Richards /NENS/HSF

Near Earth Networks Services

Agenda



- Changes Since STS-132
- Dual TDRSS
- Proficiency Testing Since STS-132
- STS-133/-134 Overview
- STS-133 Mission
- STS-134 Mission
- Issues and Concerns
- Backup Slides

Contract Changes Since STS-132

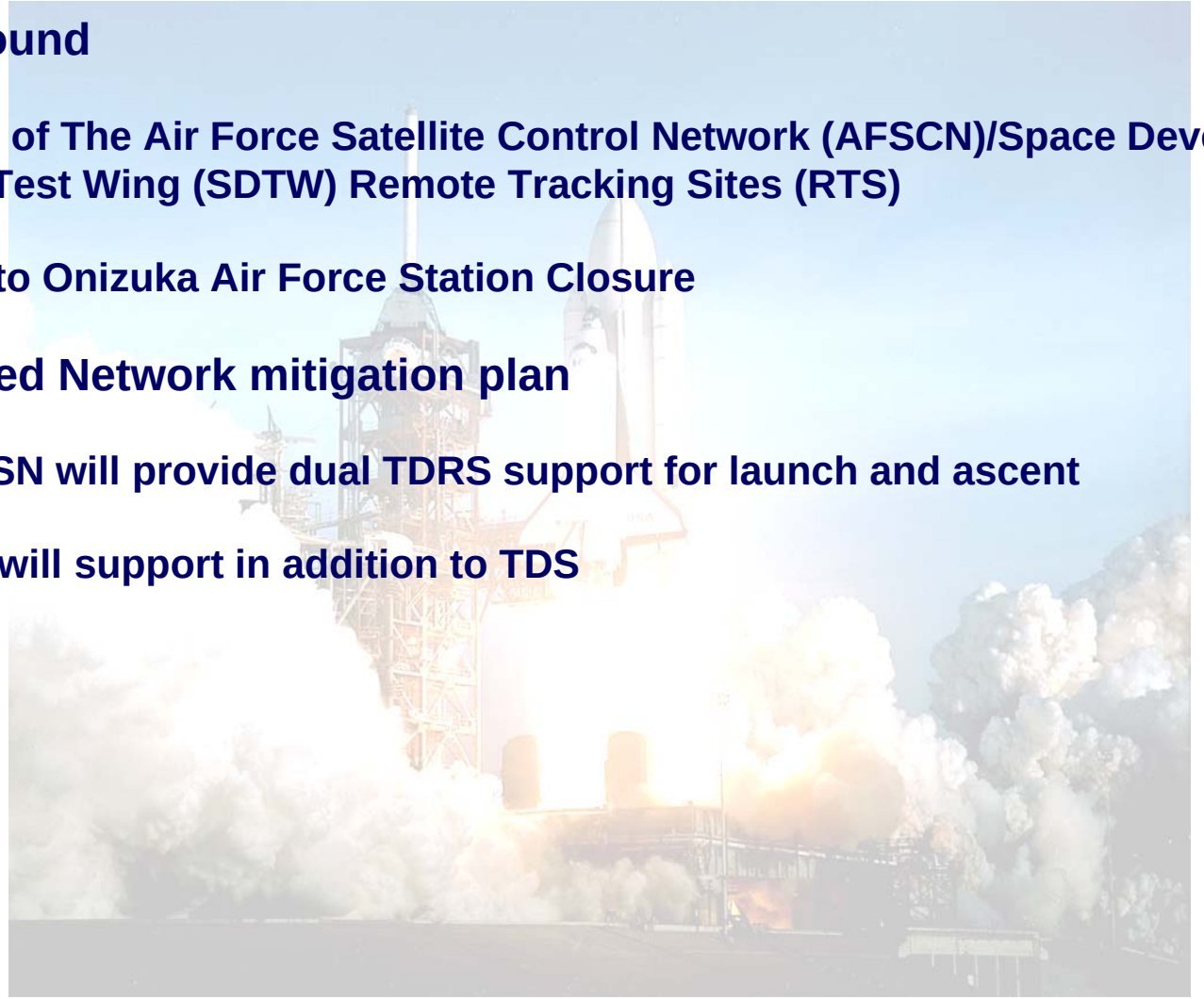
- **Wallops Range Control**
  - **Wallops 7m antennas, UHF site and C-band Radars will come under the new Range Operations Contract (ROC) effective 08/27/10**
    - **Operational interfaces will remain unchanged with the exception of scheduling**
  - **Wallops Ground Station (WGS) 11m antenna and Very High Frequency (VHF) equipment will remain under the current Near Earth Networks Services (NENS) contract**
- **NISN Contract Change**
  - **GSA's FTS-2001 contract is ending and services will be transitioned to the new GSA Networx Contract**
    - **The Networx contract was awarded to AT&T on 02/23/10**

SN Changes Since STS-132

- SN implementing TDRS apportionment
  - NASA customers will have routine access to only one SA antenna
  - Entire fleet will be managed like TDZ
  - Apportionment effective the week of 09/27/10
  - Will not affect STS support

Dual TDRSS

- **Background**
  - **Loss of The Air Force Satellite Control Network (AFSCN)/Space Development and Test Wing (SDTW) Remote Tracking Sites (RTS)**
  - **Due to Onizuka Air Force Station Closure**
- **Integrated Network mitigation plan**
  - **The SN will provide dual TDRS support for launch and ascent**
  - **TDE will support in addition to TDS**



Dual TDRSS (cont'd)

- **Launch configuration**
  - **TDS:**
    - **30 minutes prior to preferred launch time**
    - **Low Frequency, Spreading On, East Codes**
  - **TDE:**
    - **15 minutes prior to preferred launch time**
    - **High Frequency, Spreading On, West Codes**
  - **TDZ:**
    - **Predicted AOS (19 minutes MET) to TDZ LOS**
    - **Low Frequency, Spreading On, West Codes**
  - **T171:**
    - **Predicted AOS (50 minutes MET)**
    - **Low Frequency, Spreading On, East Codes, K-Band only as placeholder**

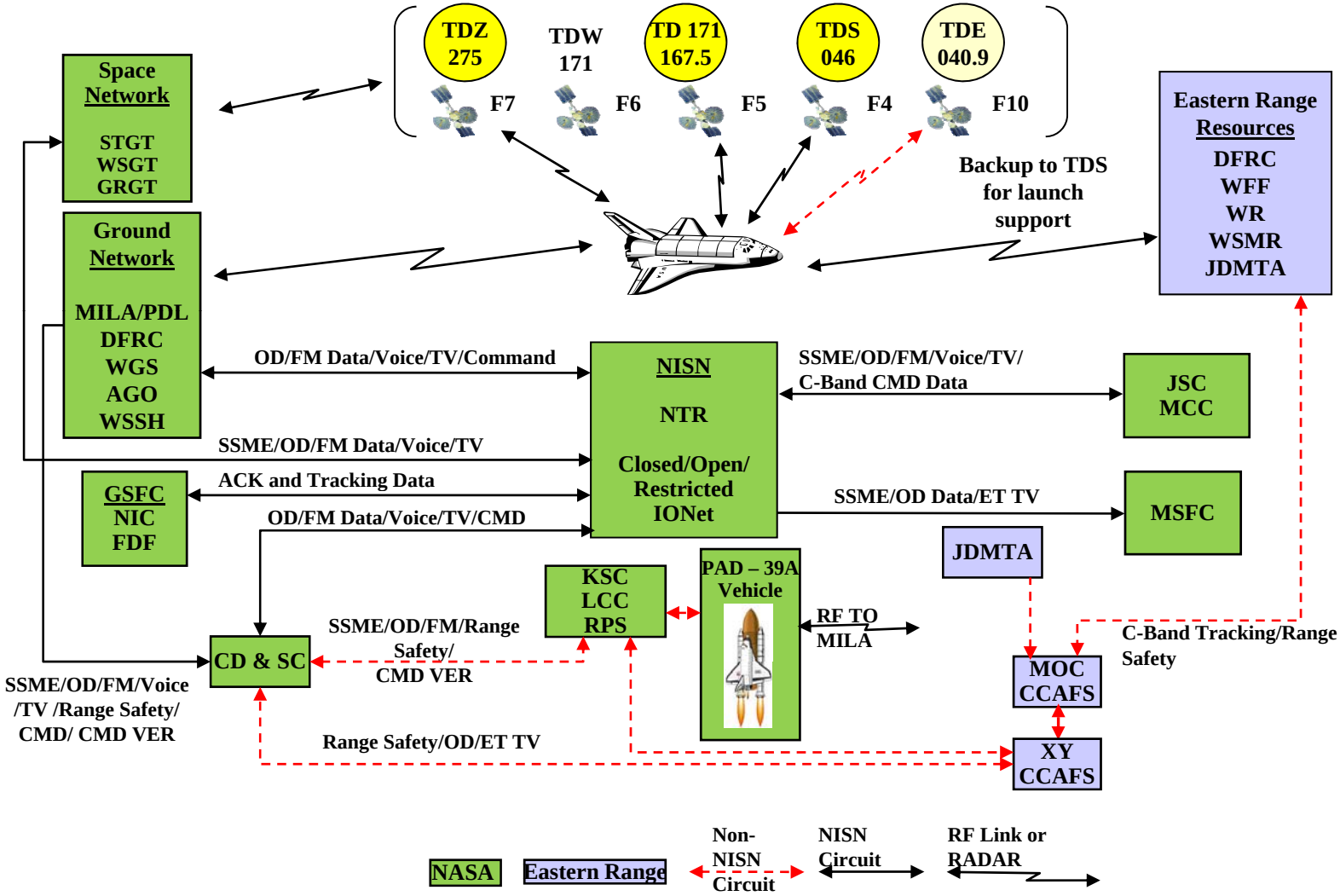
Dual TDRSS Testing

- 08/12/10 - MILA Launch Simulation using STS Portable Shuttle Simulator (PSS)
  - Successfully exercised nominal ascent configuration
  - TDS in low frequency and TDE in high frequency
- 08/16/10 - Electronic Systems Test Laboratory (ESTL) TDS SA-1 and SA-2
  - Successfully exercised ascent scenarios
  - TDS SA-2 in low frequency and TDS SA-1 in high frequency
- Upcoming testing for STS-133 SN ascent configuration
  - 09/21/10 – Post STA/PSS Flyby Test at MILA
    - Launch simulation will be exercised with MILA, SN, GSFC and JSC
    - MILA will utilize 9m #2
  - 10/19/10 – STS-133 launch simulation

Proficiency Testing Since STS-132

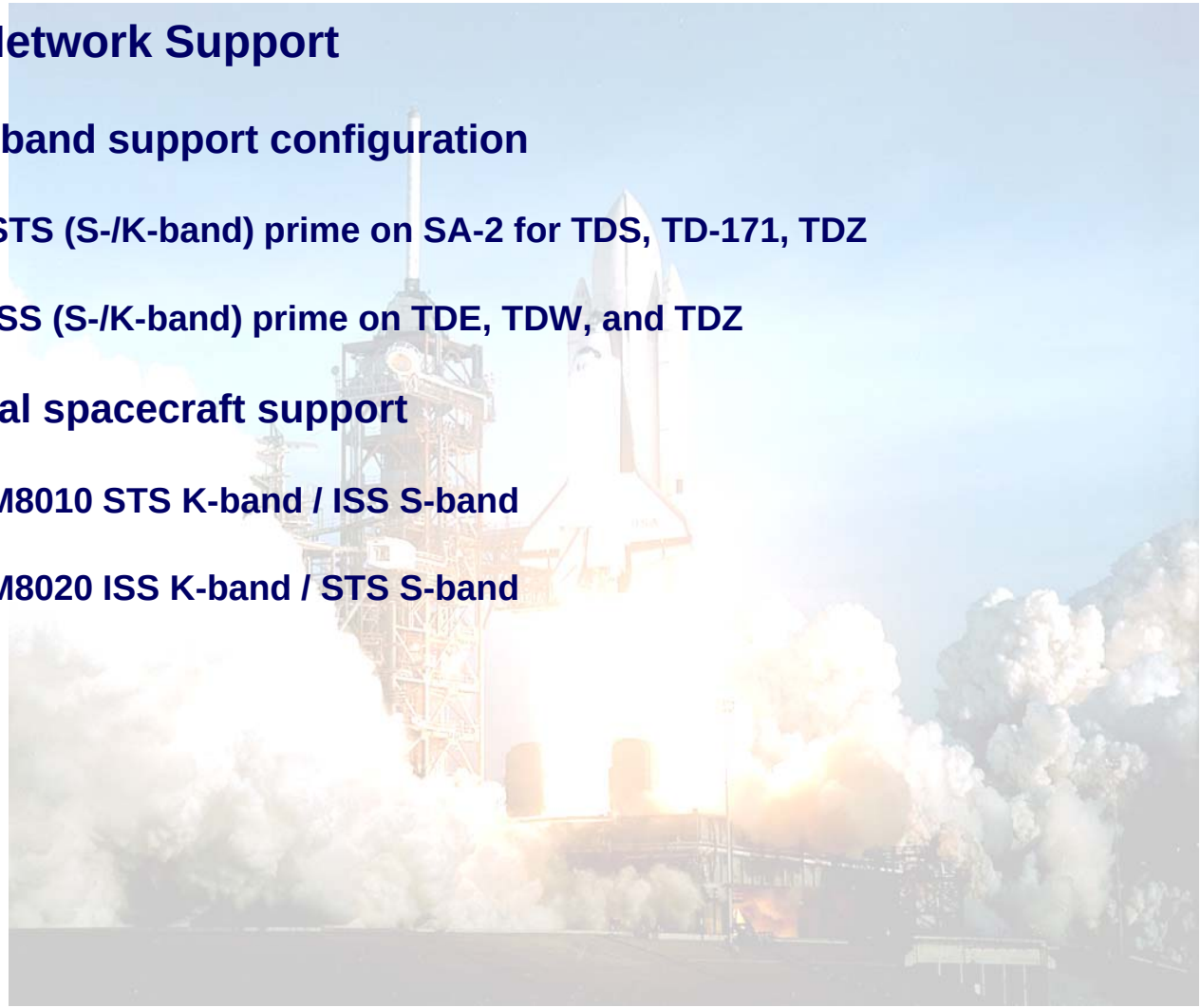
Test Name	Date
KFRL Testing	6/10/10
NIC FEP#3 Acceptance Test w/ MILA	6/15-16/10
Launch Simulation with NIC only	6/28/10, 6/30/10, 7/12/10, 7/14/10, 8/16/10, 8/18/10
Launch Simulation with JSC	7/7/10, 8/12/10
MILA L-1/Landing Sim	6/29/10, 7/1/10, 7/13/10, 7/15/10, 8/17/10, 8/19/10, 9/8/10
MILA L-1/Landing Sim with JSC	7/8/10
PSS/TDRS Checkout	7/7/10
AGO/JSC Simulation	7/19/10, 8/23/10, 9/13/10
DFRC/JSC Simulation	7/21/10, 8/25/10, 9/15/10
WSSH UHF C/O	7/22/10
Space Shuttle Network Overview and GN101 Class @ MILA	8/9-13/10
Generic KSC S0044 Simulation	8/10-11/10
SN ORT Proficiency Test	8/16/10
WPS On-Orbit Testing	8/26/10, 9/16/10
PSS/TDRS Checkout	9/7/10
STA/PSS Flyby Test	9/21-23/10
FDF SN Proficiency Test	Late September
WSSH/PSS Testing	9/27-28/10
DFRC/PSS Testing	10/1/10, 10/4-6/10

STS-133 and -134 Integrated Network

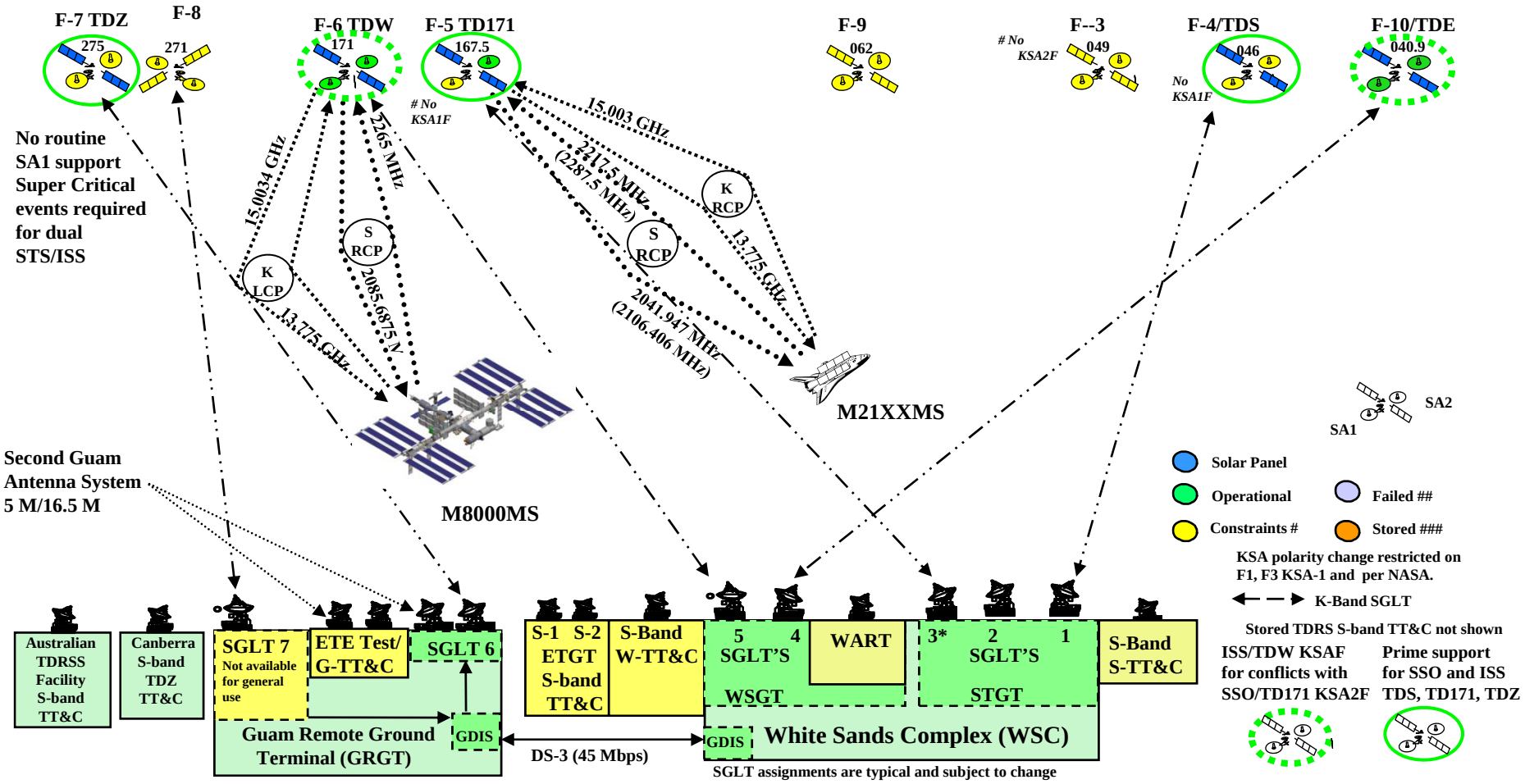


STS-133 and -134 SN Support

- **Space Network Support**
  - **S-/K-band support configuration**
    - **STS (S-/K-band) prime on SA-2 for TDS, TD-171, TDZ**
    - **ISS (S-/K-band) prime on TDE, TDW, and TDZ**
  - **Virtual spacecraft support**
    - **M8010 STS K-band / ISS S-band**
    - **M8020 ISS K-band / STS S-band**



Generic STS/ISS TDRSS Support



STS-133 and -134 TDRS-275

- JSC events will be scheduled on the SA2 antenna only
  - No routine user access is available on SA1
- Full utilization on the Eastern and Western TDRS satellites
  - To minimize time to be scheduled on TDRS-275
- The SA1 antenna can only be scheduled if:
  - Times are designated as Super Critical in the Critical Period Restriction ISI
  - Pre-approved by the NASA Network Director
- Super Critical: Supports on TDRS-275 that require both SA1 and SA2 in order to support ISS and a visiting vehicle during docking and undocking

STS-133 and -134 Integrated Ground Network

- Integrated Network ground support
  - Launch support: MILA, PDL and WGS
    - UHF, ET TV, and S-band
  - On orbit support: MILA, WGS, DFRC and AGO**
    - Available for all view periods above 7 degrees
    - Backup to TDRSS (except AGO), FM dumps and commanding as required
  - L-1 day checks and landing: MILA, DFRC and WSSH (as required)
    - UHF and S-band
  - **AGO support:
    - Committed support hours: 1230 GMT (AOS) to 2330 GMT (LOS) Monday thru Friday
    - Available outside of committed hours with prior approval

STS-133 and -134
External Tank Television (ET TV)

- MILA, JDMTA and WGS will provide real time launch coverage with PDL as receive/record only
- Qubit digital recordings (prime) will be provided to KSC EPOCC post launch by electronic file transfer from MILA and WGS by launch plus 18 hours
  - JDMTA and PDL provide removable hard drives to MILA post launch for image transfer
  - Eastern Range provides Air Force courier for JDMTA
  - Backup digital recordings available if needed

Mission Readiness Schedule

EVENT	STS-133	STS-134
ORR Inputs Call	07/22/10	11/04/10
ORR Inputs Due	08/05/10	11/18/10
ORR Dry Run	08/19/10	12/02/10
ORR/MORR	09/01/10	12/16/10
JSC DD FRR	09/16/10	01/06/11
JSC MOD FRR	09/24/10	01/17/11
SSP FRR	10/06-07/10	02/11/11
Agency	10/19/10	02/21/11
PMT	TBD	TBD
LAUNCH	11/01/10	02/26/11
LANDING	11/12/10	TBD

Completed Events

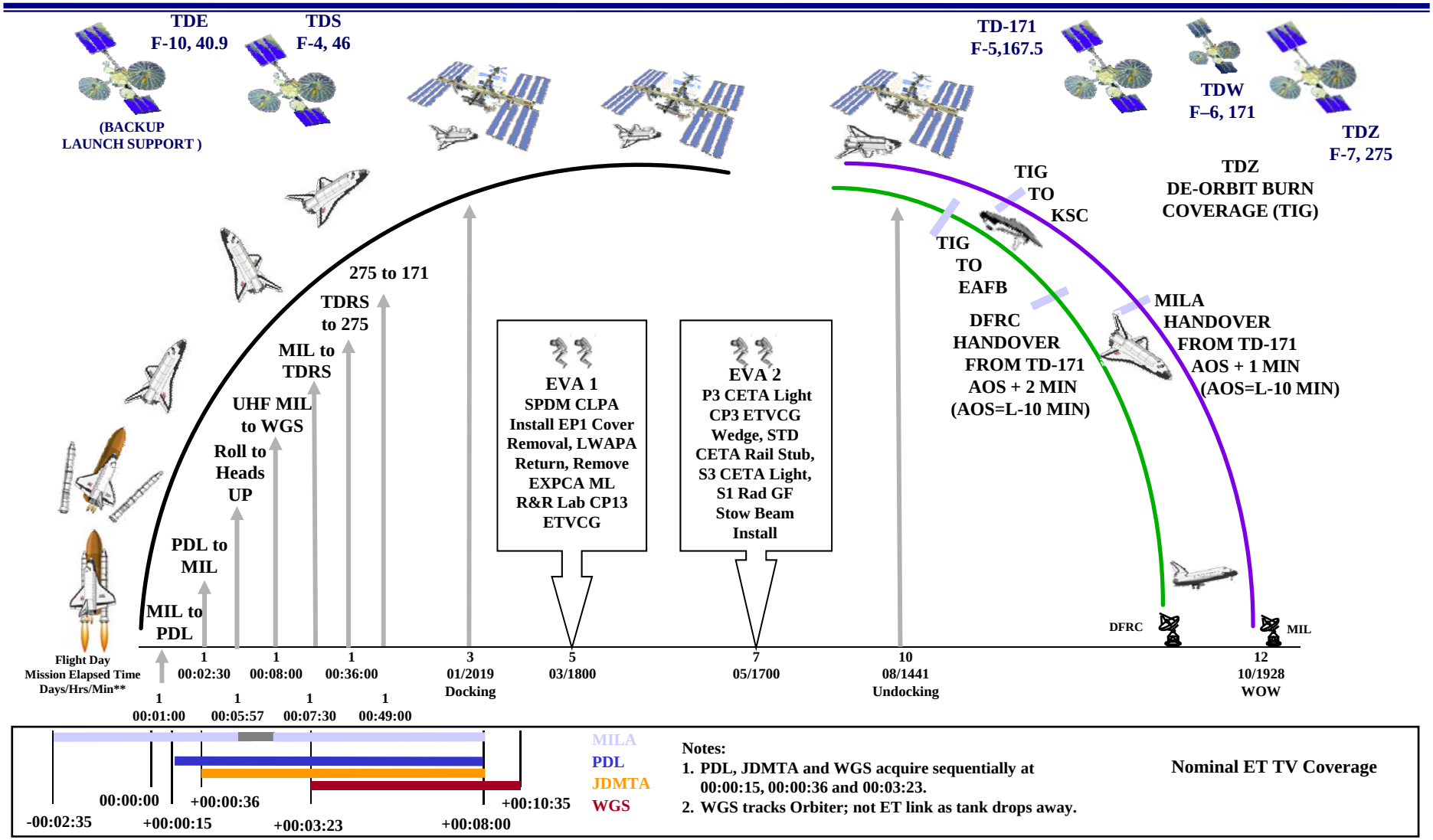
STS-133

- Space Shuttle: Discovery
- Launch pad 39A
- Launch date: 1 November 2010, 2033Z (4:33 p.m. EDT)
- Landing: 12 November 2010
- Mission duration: 11 days
- SMM: Liz Clark/Fred Pifer
- Goddard Ops: Melvin Calhoun

STS-133 Network Testing Chart

Test Name	Date
SN Proficiency Test: GSFC NIC, FDF, WSC	Late September
AGO/JSC Sim	10/12/10
DFRC L-1/Landing Sim	10/21/10
MILA L-1 and Landing Sim	10/21/10
SN VER/VAL	10/25/10
GWM Video VER/VAL	10/27/10
SN VECTOR VER	10/27/10
1108 Range Safety	10/12/10
Launch Sim: GSFC/MILA/WSG/WSC/JSC	10/19/10
Abbrev 1108 Range Safety	10/29/10
WSC Mission Readiness Test (MRT)	L-7 days

STS-133 Integrated Network Coverage Chart



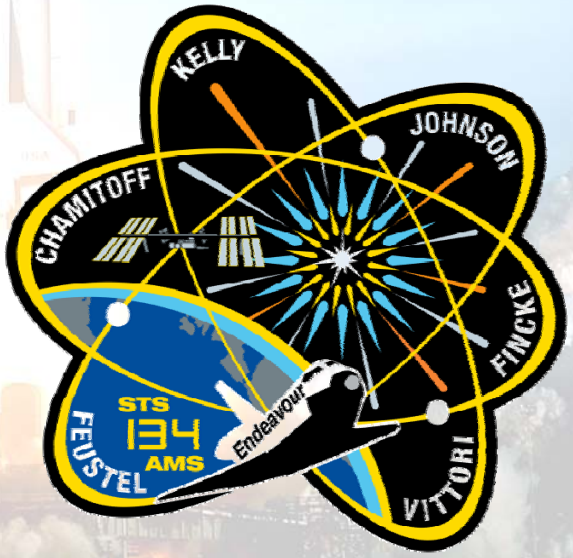
Notes:
1. PDL, JDMTA and WGS acquire sequentially at 00:00:15, 00:00:36 and 00:03:23.
2. WGS tracks Orbiter; not ET link as tank drops away.

Nominal ET TV Coverage

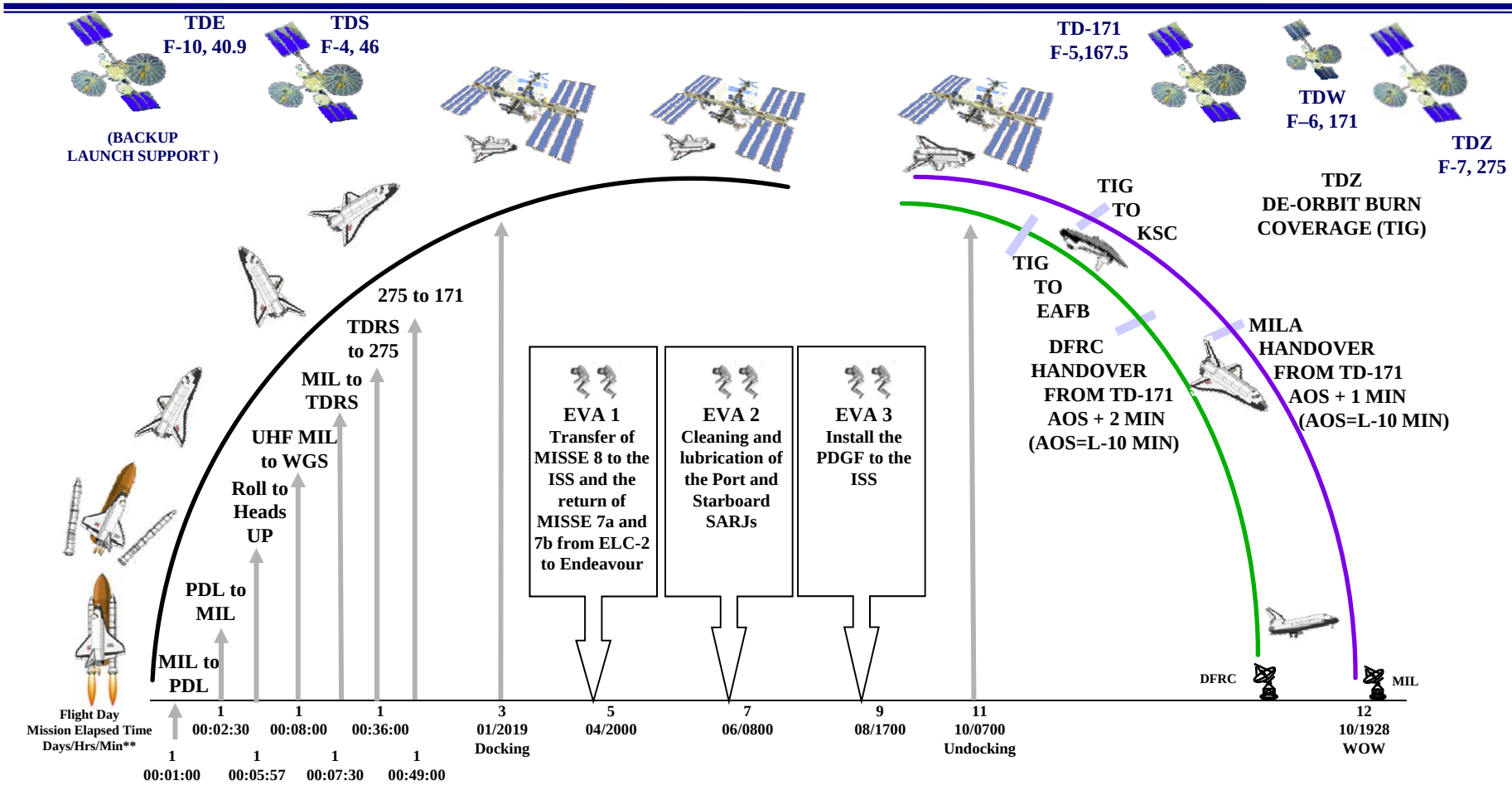
Near Earth Networks Services

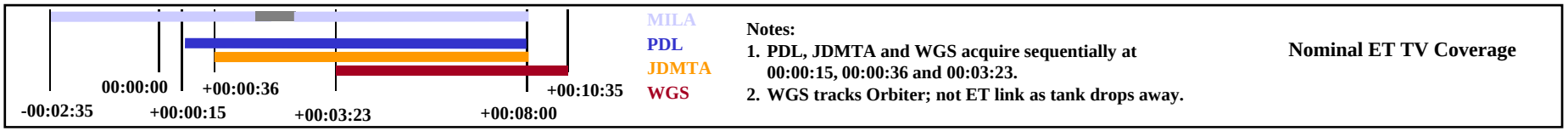
STS-134

- Space Shuttle: Endeavour
- Launch pad 39A
- Launch date: 26 February 2010
- Landing: 10 March 2011
- Mission duration: 12 Days
- SMM: Fred Pifer/Erik Richards
- Goddard Ops: Melvin Calhoun



STS-134 Integrated Network Coverage Chart





Notes:
1. PDL, JDMTA and WGS acquire sequentially at 00:00:15, 00:00:36 and 00:03:23.
2. WGS tracks Orbiter; not ET link as tank drops away.

Nominal ET TV Coverage

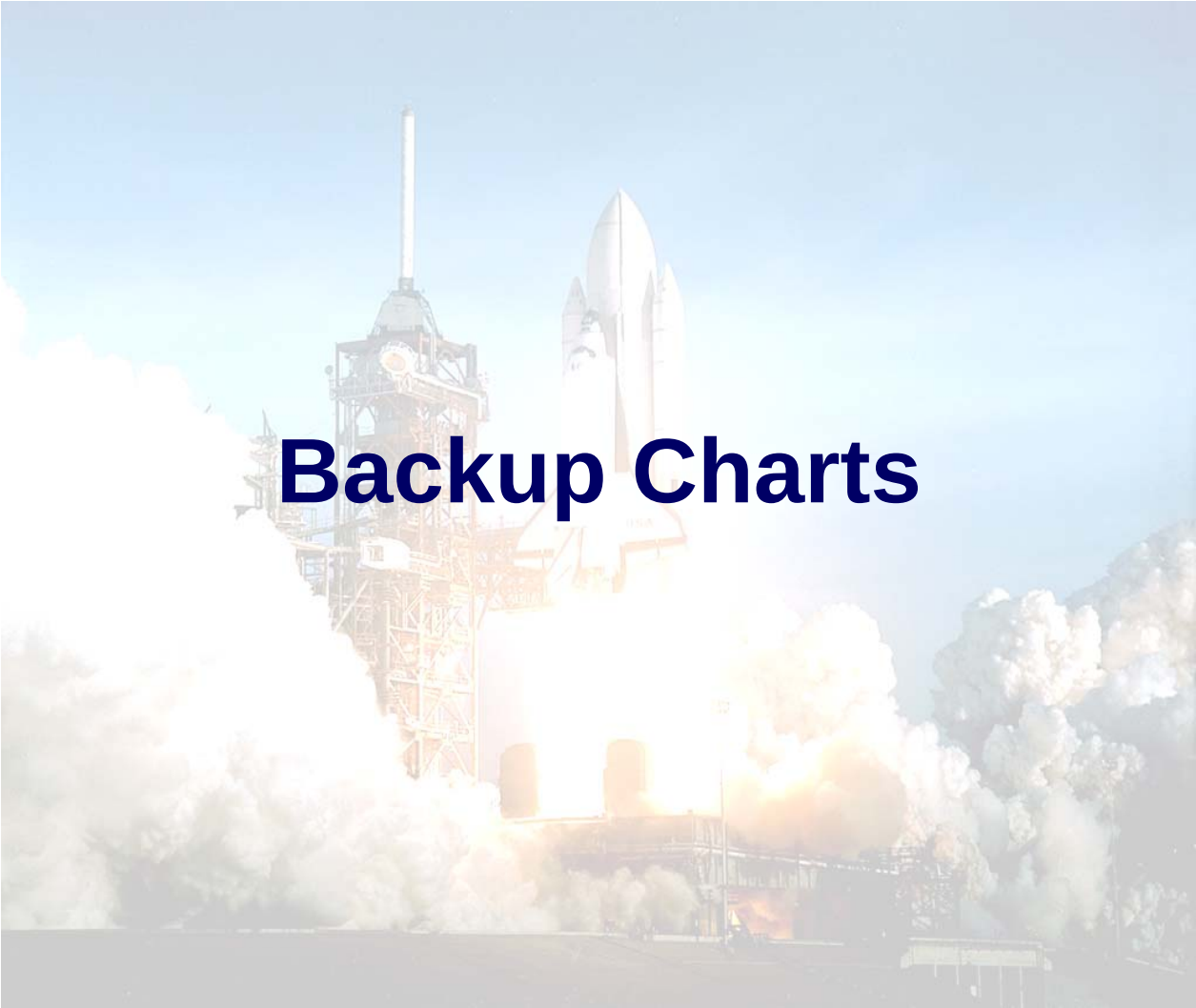
Near Earth Networks Services

Documentation

- ISI's and OPN's will be issued for each mission
  - Launch and landing counts
  - Critical periods
  - Mission meeting number with leader code and dial in password
  - Mission specific: New requirements or special instruction as needed
- 450-NOSP-Space Shuttle Revision 2
- 450-TNOSP- Space Shuttle Revision 1

Issues and Concerns

- **None**



Backup Charts

STS-133 Test Matrix

STS-133
Networks Service Requirements
Test Matrix

Green - Successfully Completed
Yellow - Partially Successful
Red - Failed
Black - Not Applicable
White - To Be Tested

	AGO/JSC Sim (10/12/10)	MILA/PDL PSS Test (10/18-29/10)	TCDT / KSC S0017 (10/14-15/10)	KSC S0044 (09/09/10)	KSC S0009 (w/ETTV) (PADVAL) (TBD)	Range Safety - 1108 (10/18/10)	Abbrev. Range Safety - 1108 (10/29/10)	MILA Landing-1 Day/Landing Sim (10/21/10)	DRFC Landing-1 Day/Landing Sim (10/13/10)	Launch Sim (10/19/10)	Vector Proficiency Sim (TBD)	SN 1201 (Ver/Val) WSC (10/26/10)	SN 1201 (Ver/Val) Guam (10/27/10)	FDF 3201 (Vector Ver) (10/27/10)	SN 5202- WSC (10/26/10)	SN 5202- Guam (10/27/10)	MILA/PDL 5202 (L-7 days)	DFRC 5202 (L-7 days)	WSSH UHF Checks (w/PSS) (09/27/10)	**Current Status**
GSFC Network Integration Center (NIC) Requirements																				
GN Verification																				
SN Verification																				
NASA Integrated Services Network (NISN) Requirements																				
Closed IONet																				
Tracking Data System																				
Flight Dynamics Facility (FDF) Requirements																				
Generate/Distribute GN Acquisition Data																				
IIRV																				
IRV																				
INP																				
Generate/Distribute SN Acquisition Data																				
Generate/Distribute TDRS Vectors																				
Evaluate Tracking Data																				
LS UDTF																				
HS UDTF																				
TDM																				
MDDF																				

Near Earth Networks Services

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White Sands Space Harbor (WSSH) Requirements																				
Acquisition Data Processing																				
LTAS																				
INP																				
IIRV																				
UHF A-G Communications																				
Eastern Range (ER) Requirements																				
Range Safety																				
C-band Radar Tracking																				
LTAS Data Generation/Distribution																				
Space Network (SN) Requirements																				
Telemetry																				
Command																				
Tracking (TDM)																				
Vector Processing (Nominal and Contingency)																				
Video																				

Near Earth Networks Services

Service Requirements/Test Matrix (cont'd)

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Santiago (AGO) Requirements																				
FM Telemetry																				
OD Telemetry																				
Command																				
Acquisition Data Processing (IIRV)																				
DFRC Requirements																				
FM Telemetry																				
OD Telemetry																				
Command																				
UHF A-G Communications																				
Tracking																				
SSM Creation/Distribution																				
Acquisition Data Processing																				
ATF1																				
ATF2																				
ATF3																				
Video																				

Near Earth Networks Services

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MILA/PDL Requirements																				
FM Telemetry																				
OD Telemetry																				
Command																				
UHF A-G Communications																				
Tracking																				
Range Safety																				
SSM Creation/Distribution																				
Acquisition Data Processing																				
9M1																				
9M2																				
Best Source Select																				
KSC RPS																				
Video																				

Near Earth Networks Services

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Wallops Ground Station (WGS) Requirements																				
FM Telemetry																				
OD Telemetry																				
Command																				
UHF A-G Communications																				
Range Safety																				
Acquisition Data Processing																				
11M																				
7.3M																				