

MISSION OPERATIONS

MISSION OPERATIONS DIRECTORATE FLIGHT DIRECTOR OFFICE



STS-103 MISSION OPERATIONS

FLIGHT READINESS REVIEW

November 19, 1999

DA8/J. W. BANTLE

STS-103 Mission Operations

- STS-103 Mission Operations
 - Mission First Items
 - Network
 - USA Flight Operations
 - MOD
- Flight Rules
 - All Flights Volume A
 - Flight Specific
- Standard Special Topics
 - STS-103 Ascent Performances
 - STS-103 Abort Regions
 - STS-103 Nominal ET Impact Area
- Significant Open Work
- Certification
- Readiness Statement

Significant Mission Firsts

- MCC Upgrade to Mariner Platform
 - Y2K Compliant
 - UNIX OS Upgrade, Kerberos Upgrade
- Reduced Capability for MOC Commanding
 - Nominal Comm System Configuration
 - SV Updates
 - System Commanding for A/E Contingencies
- Advanced Air Data in Slot 1
- Several HST EVA Tasks
- HST Rendezvous
- Significant Open Work
 - Finalize HST Rendezvous Plans
 - Potential EVA timeline impacts if ECU change out required
 - MCC CMD AR
 - Any changes to ops products based upon Boeing drawing errors uncovered.



Mission Services Projects



STS-103/HST SM-03 Flight Readiness Review

Agenda

Networks



- Integrated Network
- Ascent/Entry Support
- TDRSS Constellation
- Significant Changes
- STS-93 Network Problems
- Configuration Management
- Critical Periods

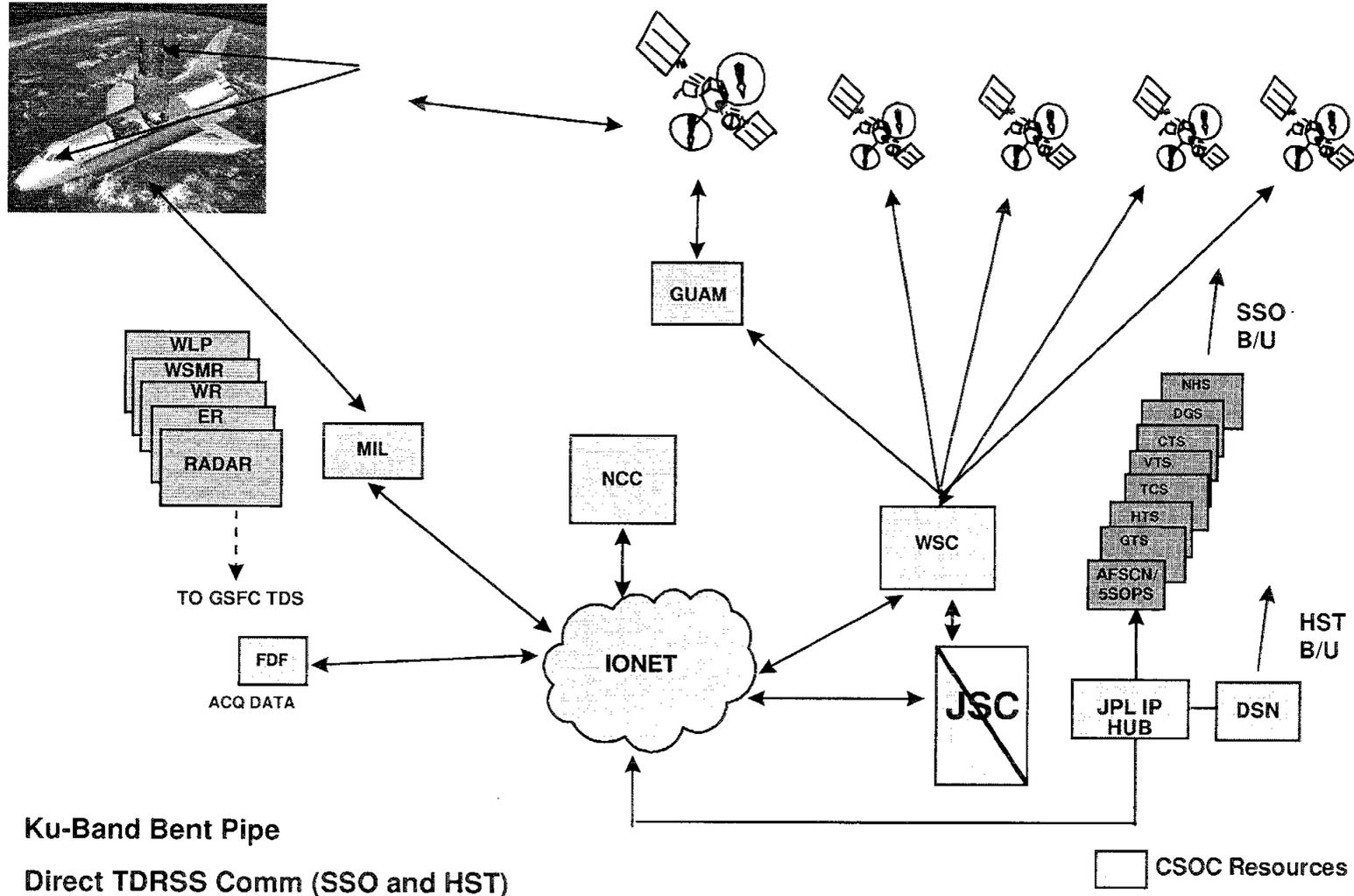
Gary A. Morse
GSFC/Networks
November 1999

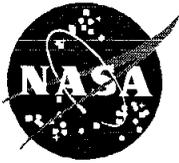


STS-103 FRR Networks



STS-103/HST SM-3 Integrated Network

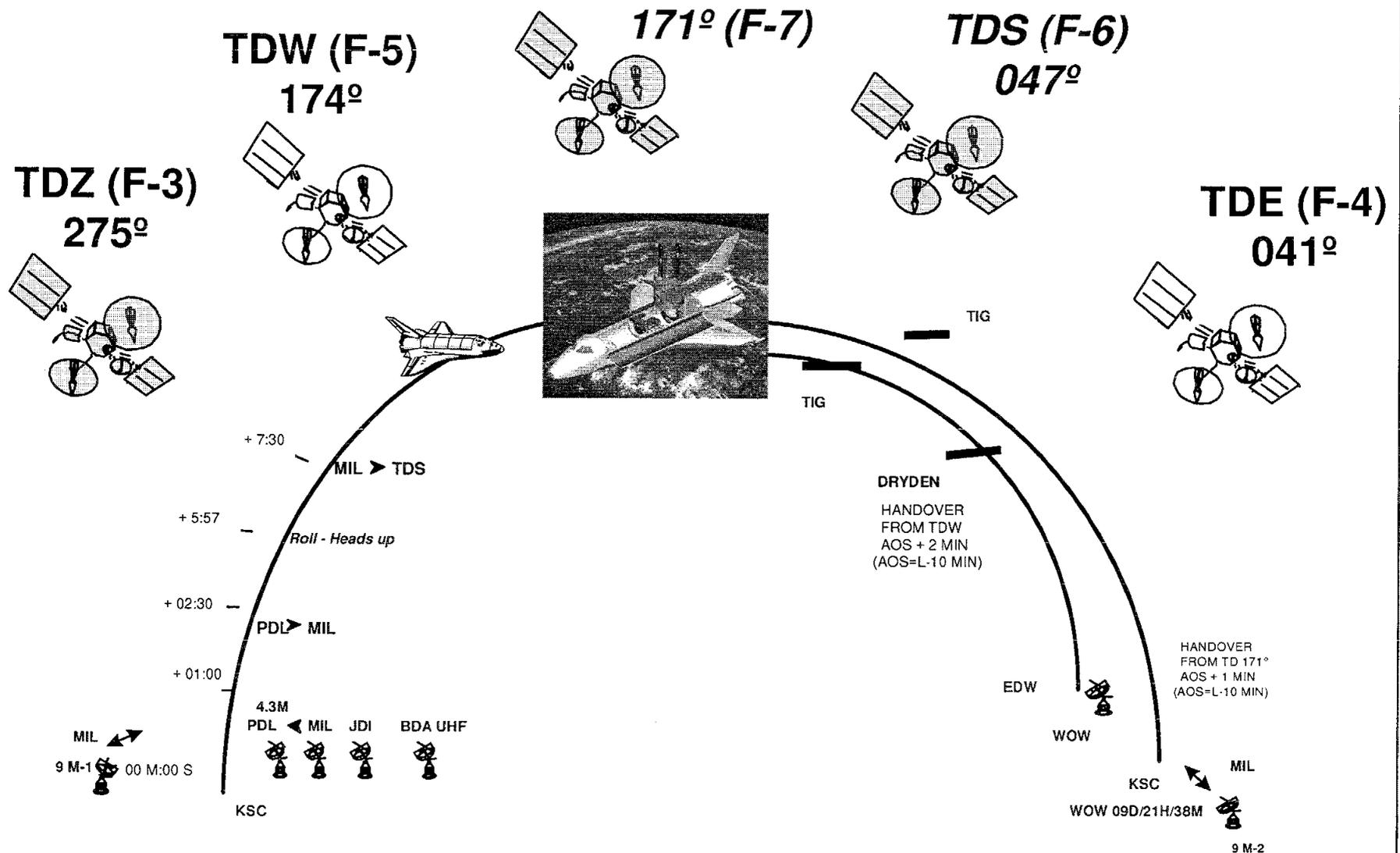




STS-103 FRR Networks



Ascent/Entry Support

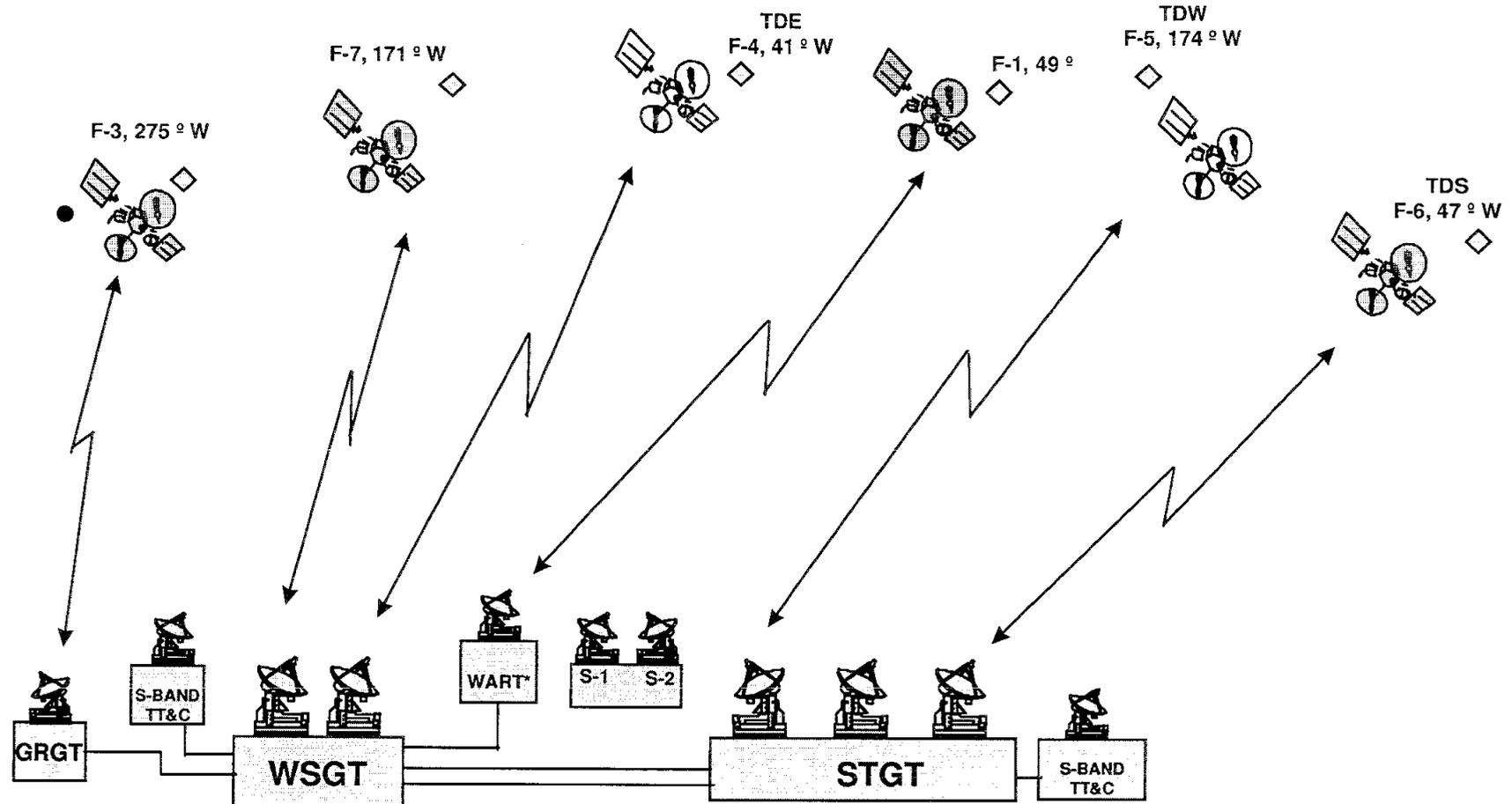




STS-103 FRR Networks



TDRSS Constellation



- NOT AVAILABLE FOR SUPPORT
- AVAILABLE ON-ORBIT AT INCO DISCRETION

◇ OPERATIONAL



STS-103 FRR Networks



Significant Changes

- **Ground Network**
 - **MILA (MBR)**
 - **Installed faster CPU's in workstations and servers**
 - **Installed SSM computer and L-Time**
 - **Improved Workstation Overview Screens for launch and on-orbit**
 - **Added Workstation Overview Screen for landing**
 - **Delivered new driver for Command Subsystem to improve NCPS Performance**



STS-103 FRR Networks



Significant Changes

- **Ground Network**
 - **BDA/MILA Dial-up Capability**
 - **BDA dedicated circuits for shuttle have been terminated**
 - **Four dial-up circuits presently exist**
 - **New hardware and modified phone configuration will provide four active circuits for support**
 - **1 A/G Voice Prime**
 - **1 Acquisition Data Prime**
 - **1 A/G Voice/Acquisition Data Backup**
 - **1 Voice (Site Coord)**
 - **Testing and procedures development is on-going**



STS-103 FRR Networks



Significant Changes

- **Space Network**
 - **WSC**
 - **Software 99003 delivered August 1999 at both WSGT and STGT**
 - **Provides scheduling enhancements for future missions**
 - **Firmware delivery 9903 at both WSGT and STGT**
 - **Scheduling enhancements for future missions**
 - **Firmware delivery 9904 delivery at both WSGT and STGT**
 - **Formalizes ETNs currently in the system**
 - **ETN 343 corrected a range zero set anomaly with 99003 software delivery**
 - **WSC diverse fiber installation completed early September 1999**
 - **Failover tests were successful**
 - **Additional failover testing will be performed during SNORT**



STS-103 FRR Networks



Significant Changes

- **Space Network**
 - **Network Control Center Software (NCC)**
 - **NCC 99.1 (Patch 8)**
 - **Corrected auto-throughput vector epoch time ordering**
 - **Successfully tested**
- **Eastern Range**
 - **KMRC and KMLC administratively down, due to annual visit of the local population (November 21, 1999 - January 1, 2000)**



STS-103 FRR Networks



STS-93 Network Problems

- **STS-93 Anomalies/Resolution were presented to the PRCB on October 22, 1999. The following items were presented with resolution**
 - **WSC Scheduling Anomaly**
 - **MIL/PDL Command Problem**
 - **MIL Forward Link Anomaly**
 - **MIL UHF A/G Anomaly**
 - **BDA UHF A/G Anomaly**
 - **SSME RPS Anomaly**
 - **DFRC Return Link Anomaly**



STS-103 FRR Networks



Configuration Management

Hardware/Software Freeze

- **Integrated networks freeze will be imposed prior to the Space Network Verification/Validation or launch minus 7 days; whichever comes first**
- **Exemptions are approved by the Network Director**

Critical Period Restrictions

- **Critical periods have been identified**
- **Maintenance and testing restrictions are imposed on Space and Ground Network elements during critical mission periods**



STS-103 FRR Networks



Critical Periods

Event	Met	Orbit	Duration
Launch (12/02/99-4:42 AM EST)			
Oms-2			
Ku-Band Activation			
HST Rendezvous	01/17:30:00	27 - 31	
HST Grapple (FD3)	02/00:33:00	31	
EVA #1 (FD4)	02/18:30:00	43 - 47	6 Hours
EVA #2 (FD5)	03/19:00:00	58 - 62	6 Hours
EVA #3 (FD6)	04/19:00:00	73 - 76	6 Hours
EVA #4 (FD7)	05/19:00:00	88 - 91	6 Hours
HST Release (FD8)	06/21:15:00	104	
Ku-Band STOW	09/01:0000	136	
De-Orbit TIG	09/20:26:00	148	
Landing	09/21:38:00	149	

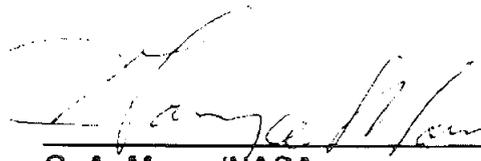


Critical Period

Goddard Space Flight Center

Certificate Of Flight Projects Directorate Networks Readiness

This is to certify that with successful completion of flight readiness preparations and closure of associated action items, all CSOC service elements are ready to support the STS-103/HST-SM-03 Mission.

 11/3/89

G. A. Morse/NASA
Space Shuttle
Network Director

Date

 4/13/99

D. Wagner/ATSC
GSFC CSOC Site
Manager

Date

Goddard Space Flight Center

Certificate Of Flight Projects Directorate Networks Readiness

This is to certify that with successful completion of flight readiness preparations and closure of associated action items, all integrated networks and CSOC elements are ready to support the STS-103/HST-SM-03 Mission.

Dennis Allan 11/3/99
 W. Mack/NASA Date
 Office of Flight Assurance

G. A. Morse 11/3/99
 G. A. Morse/NASA Date
 Space Shuttle Network Director

J. Z. Walker 11/3/99
 J. Z. Walker/NASA Date
 GSFC Center Mission Services Manager

W. Watson 11/3/99
 W. Watson/NASA Date
 GSFC Center Data Services Manager

J. McKee 11/3/99
 J. McKee/DFRC Date
 Center Mission Services Manager

R. Flaherty 11/3/99
 R. Flaherty/NASA Date
 Space Network Project

D. Wagner 11/3/99
 D. Wagner/TSC Date
 GSFC CSOC Site Manager

S. Currier 11/3/99
 S. Currier/NASA Date
 Ground Network Project

T. Sobchak 11/3/99
 T. Sobchak/NASA Date
 Space Shuttle Networks Test Manager
 Space Shuttle Networks Test Manager

R. Helmick 11/3/99
 R. Helmick/SFC Date
 WAN Manager
 WAN Manager

STS-103
Flight Readiness Review

November 19, 1999

USA Flight Operations

FLIGHT OPERATIONS AGENDA

Presenter:

Chuck Knarr

Organization/Date:

Flight Operations/11-19-99

- **Requirements Compliance**
- **Facilities Readiness**
- **Flight Design Readiness**
- **Flight Preparation Product Readiness**
- **Training & Certification**
- **Flight Control Readiness**
- **Out of Family - Covered under Facilities/MCC**
- **Special Topics - None**
- **CoFR Statement**

REQUIREMENTS COMPLIANCE

Presenter:

Chuck Knarr

Organization/Date:

Flight Operations/11-19-99

- **Requirements**
 - **SSP Requirements Documentation Summary**
 - **Flight Preparation Requirements Book (FPRB), Gen-BC and 103MEOCF- P (R1- V for flight design)**
 - **Waivers & Exceptions**
 - **None**
 - **Significant non standard open work**
 - **ME PBI recovery actions - FDF and Crew/FCT training**
 - **Final disposition of double command/two stage command failure anomaly**
 - **Potential for additional HST prox ops and grapple training - TBD**

FACILITIES READINESS

Presenter:

Chuck Knarr

Organization/Date:

Flight Operations/11-19-99

- **Mission Control Center (MCC)**
 - **Significant Software Changes -**
 - **New Platform Services release - Mariner 3.2 (Y2K) - released 11/1**
 - **First Mariner release 7/8**
 - **1000+ hrs of testing & 1100+ hrs of sims on 3.X before flight**
 - **3.2 Changes: Fixed clock signal problem between KSC & JSC and 5 command system anomalies - 140 test and sim hours**
 - **Limited MOC command capability - S/V update & comm reconfig**
 - **Protects critical phases for GCS failures**
 - **MIT Version of KERBEROS**
 - **Fixes process hang problem - Procedural and software protection maintained just for added protection - released with Mariner on 7/8**
 - **First use of GCS POCC Haz Command enhancement - tested with GSFC HST POCC on 10/19**
 - **First test on Orion 6.3 on 7/9**

FACILITIES READINESS

Presenter:

Chuck Knarr

Organization/Date:

Flight Operations/11-19-99

- **Mission Control Center (MCC) (cont'd)**
 - **Significant Software Changes (Cont'd)**
 - **Critical Processor Changes**
 - **MOC command processor - backed out new OI-27 antenna management commands - cert 8/5**
 - **All critical user apps recertified for Mariner 3.2**

FACILITIES READINESS

Presenter:

Chuck Knarr

Organization/Date:

Flight Operations/11-19-99

- **Mission Control Center (MCC) (cont'd)**
 - **Significant Hardware Changes - None**
 - **Anomaly Reports - dispositioned for flight (closed, ops work around, fly as is) - No IFAs**
 - **STS-96 Power Transfer Problems (OOF) - voltage sag during auto transfer to diesel power impacted some sub systems**
 - **Manual transfer if required**
 - **Read/Write Server Data Loss (OOF) - routine clean up of FEP deleted data on R/W server due to an incorrect link between the two pieces of hardware**
 - **Clean up software changed to prevent a reoccurrence - procedures that allowed the link to occur have been modified to prevent a reoccurrence**
 - **DVIS - Data saturation required cold start during STS-96 pre launch**
 - **Workaround: cold start to clean up system before console ops**

FACILITIES READINESS

Presenter:

Chuck Knarr

Organization/Date:

Flight Operations/11-19-99

- **Mission Control Center (MCC) (cont'd)**
 - **Anomaly Reports - (cont'd)**
 - **Loss of A/G Voice after FEP select over - double failure case - two occurrences to date - does not affect cmd, tlm or tracking**
 - **Does not affect UHF**
 - **Both failures detectable - 1 min delay of selectover avoids loss**
 - **Patch A/G voice if failure occurs (several minutes) and recycle the system (15 min) to recover full capability**
 - **PDI Data Strip and Ship Data Loss - occurred 11/10 - data synch problem - ops workaround in place for flight (tested 11/15)**
 - **Sluggish POCC Throughput Commanding - occurred 11/10 during STS-99 sim - one occurrence to date - only impacts POCC commands**
 - **Cause: GCS failure to add time tag to command for uplink - locks the POCC command uplink queue and annunciates error message**
 - **Work around in place for flight (ops note) - “bad” command cleared and queue released - POCC resends cleared command**
 - **Flight team (including POCC Team) will be briefed prior to flight**

FACILITIES READINESS

Presenter:

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Organization/Date:

Flight Operations/11-19-99

- **Mission Control Center (MCC) (cont'd)**
 - **Anomaly Reports - (cont'd)**
 - **POCC Command Sent Twice/ Two Stage Command Failure - occurred 11/8 - generic to GCS since first released - disposition pending**
 - **Cause: POCC command and real time command processes write to the GCS output buffer at the same instant (within micro seconds of each other) - extremely remote probability**
 - **Potential impacts - POCC or RTC commands uplinked twice - failure to uplink overwritten command - potential uplink of corrupted commands with parts of both command strings**
 - **Option 1: Fly as is - low risk: remote probability of occurrence when exposed (simo command processes in use) and zero probability during critical phases (no simo commanding) - final risk assessment in work**
 - **Option 2: Fix GCS - requires GCS rebuild - low risk due to simplicity of fix (move one line of code) and ability to test new GCS build - shelf life pre flight will be minimal**
 - **Final disposition briefed at L-2**

FACILITIES READINESS

Presenter:

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Organization/Date:

Flight Operations/11-19-99

- **Mission Control Center (MCC) (cont'd)**
 - **Network Interface Readiness - all connectivity is in place and has supported operational testing - Fin Ver/Val scheduled for 11/23**
 - **All JSC payload support facilities and remote POCC interfaces are configured and ready for flight - same config as STS-82**
 - **Space Telescope Ops Control Center (STOCC) at GSFC and Space Telescope Science Institute at Baltimore**
 - **HST CSR, Mission Management, Space Support Equip and EVA Teams at JSC**
 - **Significant non standard open work - final disposition of POCC command/two stage command failure AR**

FACILITIES READINESS

Presenter:

Chuck Knarr

Organization/Date:

Flight Operations/11-19-99

- **Mission Control Center (MCC) Activity Management**
 - **Purpose - control change related facility risk to protect critical and complex STS-103 ops**
 - **STS-103 ops divided into 3 levels of criticality**
 - **Critical ops - includes ascent & deorbit/entry - requires minimum risk of loss of facility services - no changes to facility config permitted - parallel ops limited to mandatory only (ISS ops support)**
 - **Complex ops - includes rendezvous & grapple, EVAs and HST release - no planned changes to facility config - parallel ops limited to mandatory plus critical path Program requirements (MEIT/Mission sequence, 5A load checkouts, etc.)**
 - **Problems occurring during parallel activities that require reconfiguration will be deferred to quiescent ops when possible**
 - **Flight Director approval required for any changes to facility config**
 - **Quiescent ops - when possible, all config changes occur here - Shuttle GC in coordination with Flt Dir must approve all changes**
 - **GC responsible for config control from L-30 hrs until landing +2 hrs**

FACILITIES READINESS

Presenter:

Chuck Knarr

Organization/Date:

Flight Operations/11-19-99

- **Integrated Planning System (IPS)**
 - **Significant Hardware Changes**
 - **First use of IBM DOLILU MPSR - CDC backup until L-6:30 - Program OAR on 8/31 with cert on 9/3 - L-7 day check on 11/25E**
 - **First use of Huntington Beach DOLILU circuits - ISVT on 8/13**
 - **Significant Software Changes**
 - **D8.1 software - released 9/20 - numerous SR and AR updates to IPS tools - several months of shelf life supporting sims and ISS continuous ops**
 - **Anomaly Reports - all dispositioned**
 - **STS-93 DOLILU processor slow down - caused by process running in the back ground (Cron job) - disable for STS-103 - generic requirement added to screen all planned back ground programs prior to flight**
 - **Significant non standard open work - none**

FACILITIES READINESS

Presenter:

Chuck Knarr

Organization/Date:

Flight Operations/11-19-99

- **Other USA accountable flight operations facilities are ready for mission support**
 - **SMS**
 - **ME Shutdown P/B labeled like OV-103 and software models match labels**
 - **Instructors can simulate correct indications for BC1 loss without a model update**
 - **Decals corrected before next ascent sim (11/19)**
 - **Training impacts covered under crew training**
 - **SAIL**
 - **Same config as OV-103 - confirmed 11/16**

FLIGHT DESIGN READINESS

Presenter:

Chuck Knarr

Organization/Date:

Flight Operations/11-19-99

- **Design meets all NASA requirements (FDRD, FRD, etc.)**
 - **Limit Exceedences - none**
 - **Entry thermal analysis complete - no violations**
- **Mission First or Unique Items:**
 - **IBM DOLILU MPSR, lightweight GRTLS, RTLS/ATO overlap, shorter launch window than STS-82 due to ET footprint (42 min vs. 65 min)**
- **All anomalies dispositioned**
 - **Significant Anomaly Reports - none**
- **Significant non standard open work - none remaining**

FLIGHT PREP PRODUCT READINESS

Presenter:

Chuck Knarr

Organization/Date:

Flight Operations/11-19-99

- **Products**
 - **All Shuttle Recon ARs & PARs have been dispositioned**
 - **Unexplained baseline data set change - briefed at STS-96 FRR**
 - **Conducted complete verification of the STS-103 data set**
 - **Problem identified with STAR tool software - fix released 6/21**
 - **Shuttle I-load patches: None**
 - **POC Software: Delivered, verified and flight ready**
 - **Significant non standard open work - none**
- **Procedures**
 - **FDF Status (as of 11/16)**
 - **No issues - ME PBI impact is minimal**
 - **Crew review on 11/9 (delta scheduled for EVA C/L on 11/19) and ship 11/28**
 - **Significant non standard open work - none**

TRAINING & CERTIFICATION

Presenter:

Chuck Knarr

Organization/Date:

Flight Operations/11-19-99

- **Crew Training**
 - **Flight-specific Shuttle Crew Training Plan: All training has been or is scheduled to be completed prior to launch**
 - **Impact of ME Shutdown P/B wiring problem - Training can successfully train the crew and flight controllers with the updated SSME PBI Control Bus configuration using updated FDF and meet 12/6 launch date**
 - **Three Ascent sims to train correct config between 11/19 and flight - will train center engine shutdowns with corrected procedures**
 - **Crew is trained for HST approach and grapple for loss of gyro scenario - 11 SES sessions completed to date**
 - **Additional training may be required based on observed HST dynamics and final prox ops profile**
- **Integrated Training**
 - **On schedule (2 ascents & 1 entry remain)**
- **All instructor and facility operations personnel are trained and certified**

FLIGHT CONTROL READINESS

Presenter:

Chuck Knarr

Organization/Date:

Flight Operations/11-19-99

- **Real-time support software status**
 - **All user applications that support real-time Ops are certified and incorporated into the Ops baseline (as of 11/19)**
 - **Several non critical user apps certified late due to change to Mariner**
 - **Payload application software and displays are certified**
 - **Significant Anomaly Reports - none**
 - **Significant non standard open work - none (if 11/19 cert as scheduled)**
- **Personnel**
 - **All CAF & USA GAF flight controllers will be certified for flight**
 - **Significant non-standard open work - none**

SSP STS-103 Certification of Flight Readiness

Presenter:

Chuck Knarr

Organization/Date:

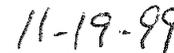
Flight Operations/11-19-99

- The USA Flight Operations FRR, NASA MOD FRR, and USA SFOC Pre-FRR have been completed.
- All Contractor Accountable Functions (CAF) have been completed, or are scheduled for completion, in accordance with NASA requirements and the applicable portions of the Space Flight Operations Contract Flight Preparation Process Plan (NSTS 08117, section 8.5.18 and appendix "R").
- All required products have been or are scheduled to be delivered per requirements.
- All facilities have been configured and are ready for mission support.
- All CAF personnel are trained and certified, when required.
- Flight crew has been trained.
- There are no open issues.
- Pending completion of the defined open work,

**USA FLIGHT OPERATIONS IS READY
TO SUPPORT THE STS-103 MISSION.**



C. R. Knarr
Deputy Associate Program Manager, Flight Operations



Date

STS-103 Mission Operations

- Government Accountable Function (GAF) portion of Flight Data File is ready.
 - MEPB Drawing Errors - FDF changes have been impacted.
 - If any other errors in the Boeing drawings are found, then we will need to evaluate impacts to operations products.
- Flight Control Team and Flight Crew training and certification are on schedule for completion prior to flight.
- Proper definition, insight, and review of the following confirms ready for flight:
 - Mission Control Center
 - Critical Processors
 - Remaining CAF Flight Data File
 - Flight Design

STS-103 Mission Operations - Significant Items

- Two TAL Sites Available (Banjul and Ben Guerir) - No TAL Sites Required
 - Overlap of RTLS and Press to ATO
 - Prioritization of TAL sites has been reviewed with Space Shuttle Program.
- Evaluated 2-Engine TAL for SSME failure prior to SRB separation
 - TAL to BYD capability exists 10 seconds prior to SRB separation.
 - Concerns include: Droop logic may engage (uncertified TAL), ARD performance and accuracy, RTLS certification delays.
 - Will select RTLS for engine failure prior to SRB separation.
- Loss of OMS engine on critical underspeed cases - Baseline, continuing ATO dump on good engine to reduce underspeed.
- May use a FRCS perigee adjust the day before deorbit to optimize deorbit downmoding.
- DOLILU
 - Rehosted
 - Minor updates (Flight Derived Dispersions, LWT Load Indicators, Range Safety Vertical Plan)

All Flights Rules Update - Volume A, PCN-9 Significant Changes

PCN-9 was approved at the PRCB on November 4, 1999, and incorporates 17 flight rule CR's.

Significant Changes:

- Update to Landing Aid Requirements for daylight landings
 - CDR HUD with MLS is acceptable in the event PAPI lights or an aimpoint is unavailable.
 - Clarify that with no ballbar, CDR HUD and MLS are mandatory.

All Flights Rules Update - Volume A, PCN-9

Significant Changes

- Collision Avoidance Update
 - Previous rule stipulates a maneuver will be performed inside a 2 x 5 x 2 km box as long as primary payload or mission objectives are not compromised.
 - Updated rule aligns Shuttle and Station philosophy. Identifies two regions: Yellow and Red
 - Yellow (2 x 5 x 2 km box = $\sim 1 \times 10^{-5}$ prob.) - Will maneuver as long as mission impacts or operations impacts are minimal (minor consumables, timeline, pre/post-sleep).
 - Red (1 x 3 x 1 km box = $\sim 2 \times 10^{-5}$ prob.) - We will maneuver unless in doing so results in more risk than the debris (potential shuttle re-flight, vehicle hardware damage, additional risk to crew or vehicle).

All Flights Rules Update - Volume A, PCN-9

Significant Changes

- Manual Shutdown for Main Engines in Hyd/Elec Lockup
 - Remove low performance criteria (lesson learned for STS-93).
- EMU Decontamination Rules added to provide guidelines for use of drager tubes and when to perform hydrazine contamination procedure.
- Hydraulic Circulation Pump Operation - Update to reflect differences between older accumulators (piston type) and new accumulators (bellows type). Updates are to accumulator pressure maintenance and leak detection rules.
- Addition of Radiator Isolation Flight Rules to Manage Isolation Valves - Both Auto and Manual Mode.

STS-103 Flight Rules Annex

- Mission priorities defined: HST SM Rndz, servicing and deploy; two DTO's (GPS)
- MDF on Flight Day (FD) 1 will consider a FD2 Rndz, single EVA on FD3 followed by deploy, FD4 landing.
- Servicing mission priorities defined: 3 RSU's, Volt/Temp Improvement Kits (VIK), 486 computer, Fine Guidance Sensor (FGS), S-Band Single Access Transmitter, Solid State Recorder, Bay 5-10 MLI Repair, NICMOS valve open, Shell/Shield Replacement Fabric, AFT Shroud Door Lubrication, handrail covers, +V2 door latch repair, inspections
- Minimum Success: 5 operational gyros - 4 newly installed (Nominally will accomplish in first EVA.)

STS-103 Flight Rules Annex

- Full Success: 6 operational gyros, 6 VIK's, 486, and FGS (Nominally will accomplish in first two EVA's.)
- Consumables priorities consistent with mission priorities.
- Finalize rendezvous plan for current configuration and additional gyro failures. (OPEN WORK)
- Rules (and procedures) governing use of modified valve cap for airlock depress to control airflow.

STS-103 Flight Rules Annex

- Minimal installation and work site closeout requirements defined.
- One unscheduled EVA retained for deploy/safe landing configuration.
- No reboost/deboost planned, but technique is available to be used for collision avoidance if required.
- Berthed operations constraints for maneuvers and free drift defined.
- RMS operations/constraints/exceptions defined.
- B-Hatch Fails to Open - Use of D-Hatch Evaluated
 - Crew can fit through D hatch.
 - Consider B-hatch repair depending upon failure.
 - Note - Cannot get back in D hatch with PLBD's closed.

STS-103 Flight Rules Annex

- HST deploy requirements defined (HST configuration, attitude, lighting, shuttle digital auto-pilot constraints, separation maneuver).
- Advanced Air Data flown in slot one - nearly ops transparent - has some additional built-in test indications requiring cb to be pulled for BFS operations.

STS-103 Standard Special Topics

- STS-103 Ascent Performance
- STS-103 Abort Regions
- STS-103 Nominal ET Impact Area

STS-103 Ascent Performance

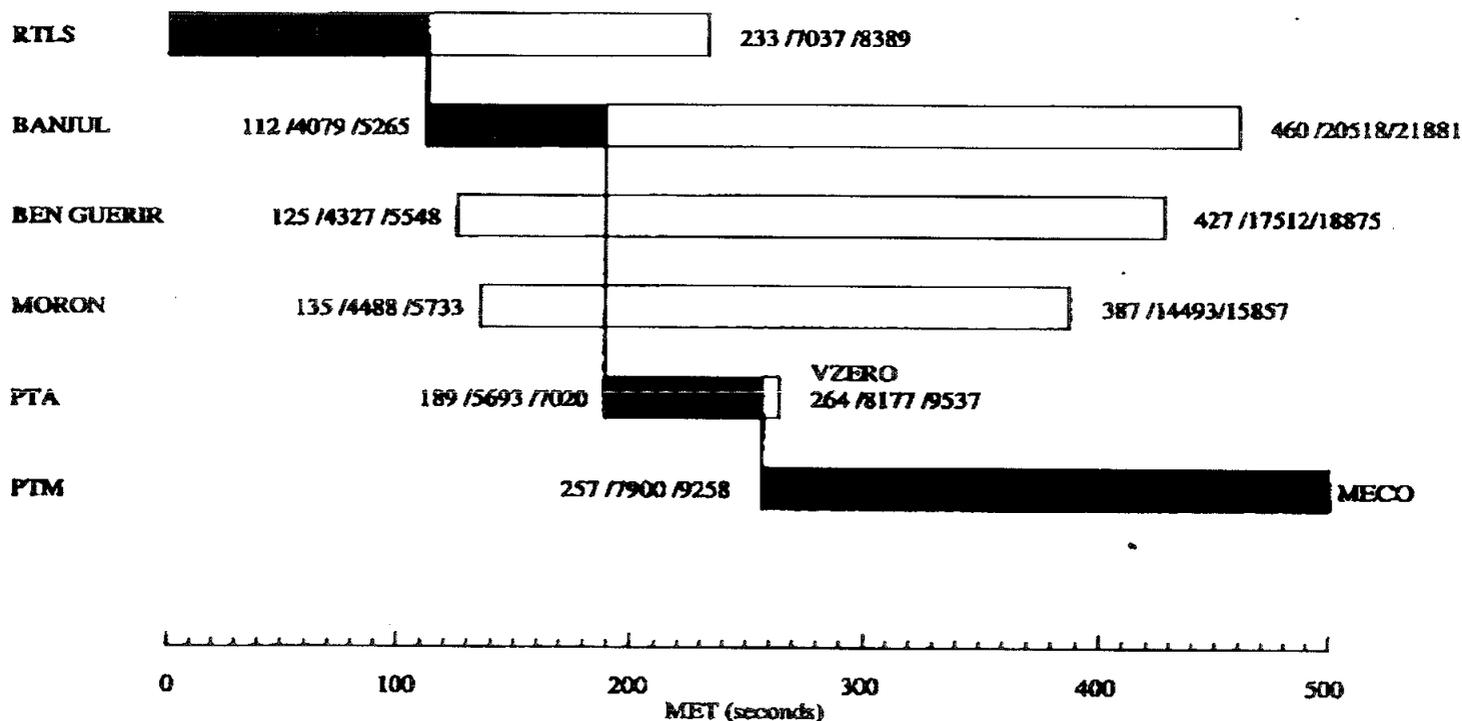
- INSERTION ALTITUDE/INCLINATION 315 NM / 28.45 DEG
- FIRST STAGE DESIGN CRITERIA DOLILU II / Lo Q/October
- LAUNCH WINDOW OPEN December 6, 1999 02:37 EST
- LAUNCH WINDOW CLOSE December 6, 1999 03:19 EST
- LANDING TIME (KSC, DARK) December 15, 1999 23:57 EST
- I-LOAD DESIGN APM * 12,799 lbs.
- FRR ASSESSMENT APM* 12,874 lbs.

* NO REDUCTION DUE TO DOL DISPERSIONS.

STS-103 Abort Regions

TDDP: FRRAF103
 Ascent Performance Margin: 12874.0 lbs
 Ascent Intact Engineer: graves
 Date: Fri Sep 3 08:28:16 CDT 1999

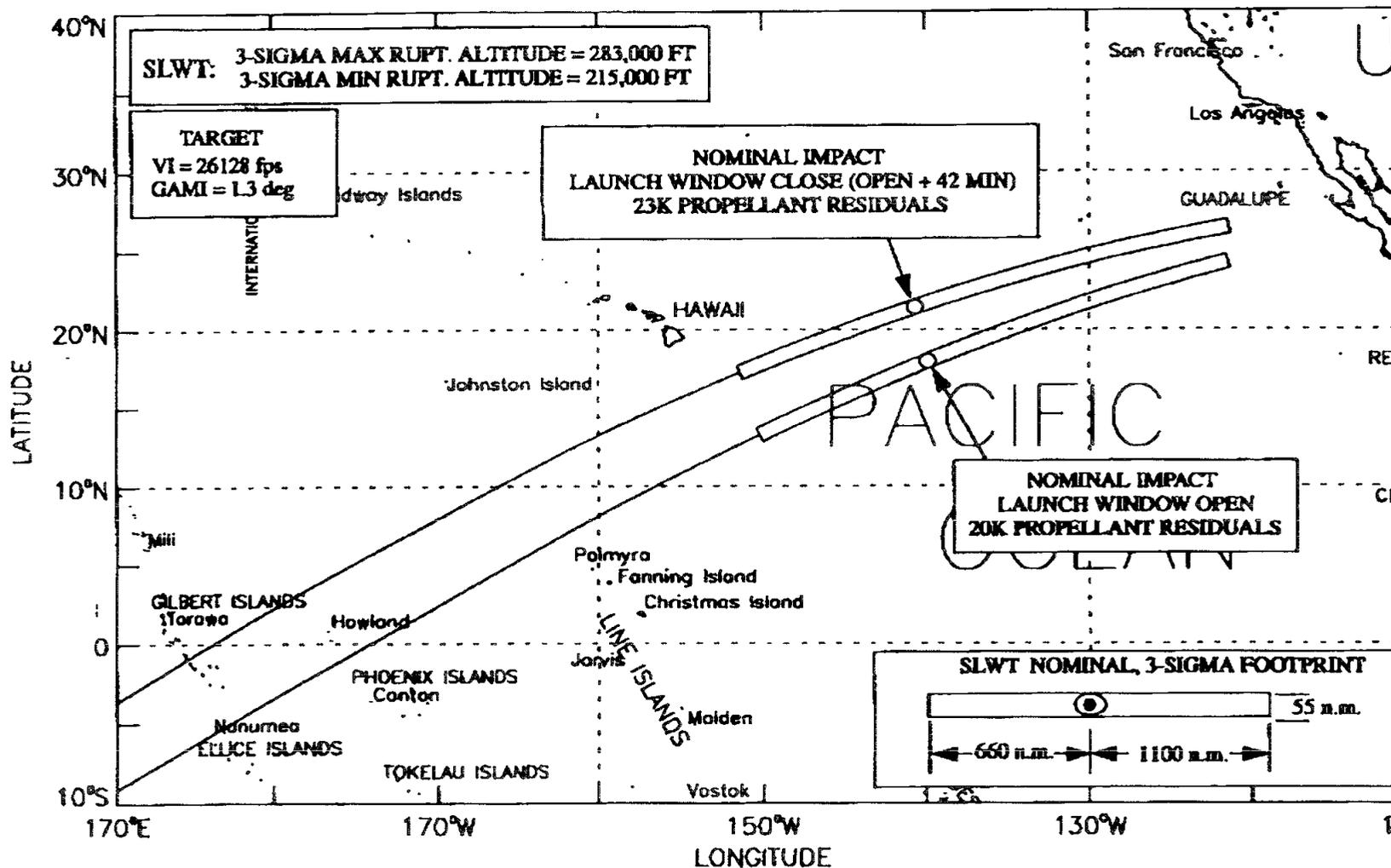
LEGEND
 E.O. Time (sec)/Rel. Velocity (fps)/Inert. Velocity (fps)



Last RTLS boundary is based on third peak heating. Last RTLS performance boundary: 242/7350/8705. Early BYD boundary is based on performance and is the earliest time droop does not engage. A BNA/Dowacy worst-on-worst Monte Carlo analysis places this Early BYD boundary @ 128 sec for OCFR1 cycle. Late BYD is based on 23 kfps about select VI. Late BEN is based on the +/- 50 deg BETA constraint. Late MRN is based on performance.

Note: Due to inherent assumptions made in its creation, this chart may not accurately depict DOE conditions and intact abort boundary times.

STS-103 Nominal ET Impact Area



Significant Open Work

- 1) Finalize HST Rendezvous plans.
- 2) Potential EVA timeline impacts if ECU change out required.
- 3) Complete risk evaluation of MCC CMD AR vs. implementing a fix and determine final plan.
- 4) Evaluate ops impacts to any drawing discrepancies that are uncovered. Modify products as required.

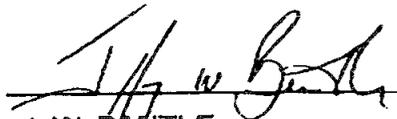
MISSION OPERATIONS DIRECTORATE
 CERTIFICATE OF FLIGHT READINESS (CoFR)
 FLIGHT: STS-103 REQUIREMENTS

<p>Critical Processors/Applications, Non-Crit Processors/Applications; Flight Rules: EMCC; Trng-MCC/POCC; FTP-New Operations; Anomaly-Proc; Ex/AI from Prior Reviews; CIL/Hazards; No Constraints; Level II Actions; Mission Requirements; Exception Resolution; CMD Proc; FPPP Requirements Met; Contractor Process Insight</p>	<p><i>J. W. Beutler</i> DA&Chief, Flight Director Office</p>
<p>Crit Processors/Applications; Non-Crit Processors/Applications; FDF; EMCC; TRNG-MCC/POCC; LCC; FTP-New Ops; Flight Anomaly Resolution; Anomaly-Proc; Ex/AI from Prior Reviews; CIL/Hazards; No Constraints; Level II Actions; Mission Requirements; Engineering Drawings; CMD Proc; FPPP Requirements Met; Contractor Process Insight</p>	<p><i>Blaine Araya Young</i> <i>for Rick Fitts</i> 11/9/99 DF/Chief, Systems Division</p>
<p>FPPP Requirements Met; Contractor Process Insight</p>	<p><i>Jim Brubaker</i> 11/9/99 DB/Chief, Systems Development and Operations Division</p>
<p>FAC-NBL; FAC-SVMF; FDF; TRNG-Crew Trng; TRNG-MCC/POCC; TRNG-EVA/MARS; LCC; FTP-New Ops; Flight Anomaly Resolution; Anomaly-Proc; Ex/AI from Prior Reviews; CIL/Hazards; No Constraints; Level II Actions; Mission Requirements; Engineering Drawings; CMD Proc; EVA Hardware Integration; Contractor Process Insight</p>	<p><i>Frederic Woy</i> <i>for Ray DeBono</i> 11/9/99 DX/Chief, EVA, Robotics, & Crew Systems Operations Division</p>
<p>Crit Processors/Applications; Non-Crit Processors/Applications; FDF; EMCC; RECON-Flight SW (MMU); TRNG-MCC/POCC; FTP-New Ops; Flight Anomaly Resolution; Anomaly-Proc; Ex/AI from Prior Reviews; No Constraints; Level II Actions; Mission Requirements; CMD Proc; FPPP Requirements Met; Contractor Process Insight</p>	<p><i>R. C. Egan</i> 11/9/99 DM/Chief, Flight Design and Dynamics Division</p>
<p>Crit Processors/Applications; Non-Crit Processors/Applications; FDF; FDF Manage; EMCC; PGSC; TRNG-MCC/POCC; FTP-New Ops; Flight Anomaly Resolution; Anomaly-Proc; Ex/AI from Prior Reviews; CIL/Hazards; No Constraints; Level II Actions; Mission Requirements; Engineering Drawings; CMD Proc; FPPP Requirements Met; Contractor Process Insight</p>	<p><i>Joseph Paul</i> for L.D.D. 11/9/99 DO/Chief, Operations Division</p>
<p>EX/AI from Prior Reviews; No Constraints; Level II Actions; Mission Requirements; FPPP Requirements Met; Contractor Process Insight</p>	<p><i>Robert Berglund</i> 11/9/99 DT/Chief, Space Flight Training Division</p>
<p>FAC-MCC; FAC-Network Interface; FAC-SMS; FAC-SPF; FAC-IPS; Crit Processors/Applications; Non-Crit Processors/Applications; FD-Trajectory; FD-Consumables; FD-PDRS; FD-Analyst Cert; FD-CTF; FDF Manage; EMCC; RECON-STAR/MASTII/CD ROM Products; RECON-MCC; TRNG-Crew Trng; TRNG-MCC/POCC; TRNG-SMS; FTP-New Ops; Flight Anomaly Res; Anomaly-Proc; Ex/AI from Prior Reviews; CIL/Hazards; No Constraints; Level II Actions; Mission Requirements; Engineering Drawings; Exception Resolution; CMD Proc; FPPP Requirements Met</p>	<p><i>Charles R. Kuan</i> 11-9-99 Associate Program Manager, Flight Operations, SFOC</p>
<p>EMCC; NETWORK; Flight Anomaly Resolution; Anomaly-Proc; Ex/AI from Prior Reviews; No Constraints; Level II Actions; FPPP Requirements Met</p>	<p><i>William A. Tamm</i> 11/9/99 Network Director, Shuttle, GSFC</p>
<p></p>	<p><i>J. W. Beutler</i> 11/17/99 Mission Operations Director</p>

STS-103 FLIGHT READINESS STATEMENT



THE MISSION OPERATIONS FLIGHT PREPARATION PROCESS PLAN DOCUMENTED IN NSTS 08117, REQUIREMENTS AND PROCEDURES FOR CERTIFICATION OF FLIGHT READINESS, HAVE BEEN SATISFIED. REQUIRED PRODUCTS AND OTHER RESPONSIBILITIES FOR MISSION OPERATIONS (NSTS 08117, SECTION 8, PARAGRAPH 8.5.7) HAVE BEEN OR WILL BE PRODUCED OR COMPLETED. ALL AREAS ARE READY. MISSION OPERATIONS IS PREPARED TO SIGN THE CERTIFICATE OF FLIGHT READINESS FOR STS-103.



J. W. BANTLE
MISSION OPERATIONS DIRECTOR



for C. L. VERMILYEA
VICE PRESIDENT AND ASSOCIATE
PROGRAM MANAGER, FLIGHT
OPERATIONS, SPACE FLIGHT OPERATIONS
CONTRACT



STS-103 FRR Networks



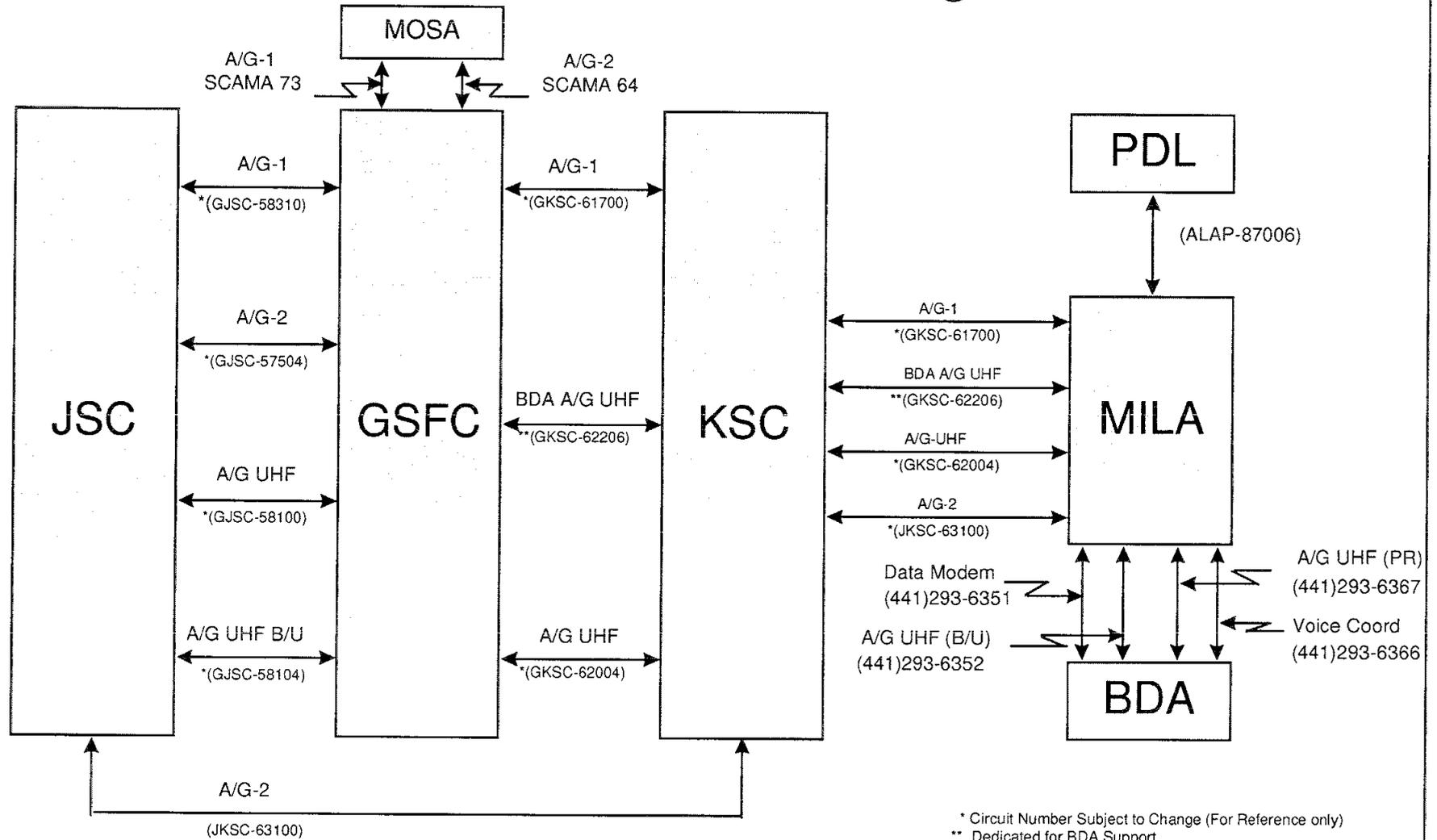
Backup



STS-103 FRR Networks



MILA/BDA/PDL AGVS Configuration

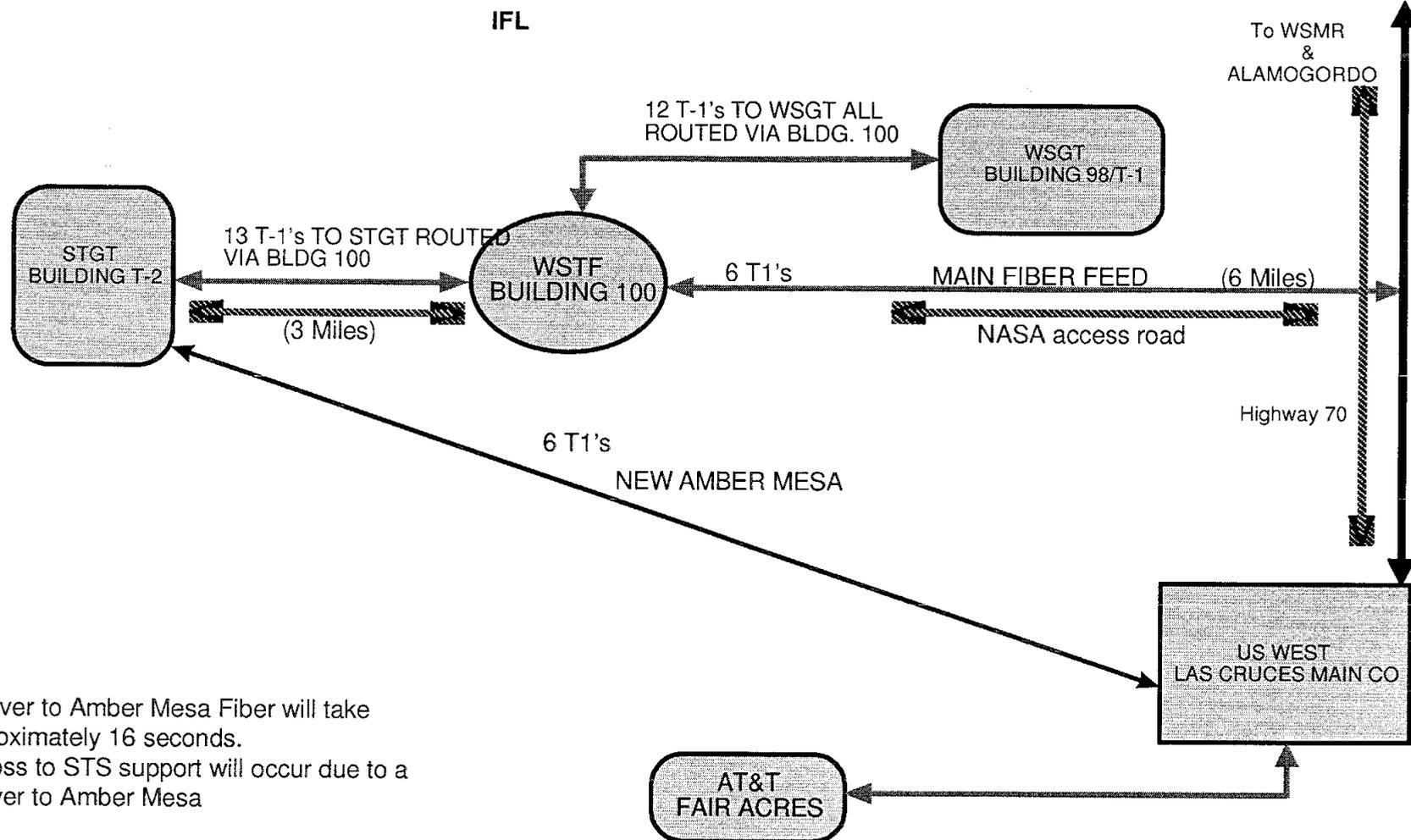




STS-103 FRR Networks



NASA Complex Carrier Fiber Configuration Post 6 T-1 Cutover to Amber Mesa Fiber



Failover to Amber Mesa Fiber will take approximately 16 seconds.
 No loss to STS support will occur due to a failover to Amber Mesa



STS-103 FRR Networks



Post-Launch Playbacks

