STS-105

FLIGHT READINESS REVIEW

August 1, 2001

Ground Operations

United Space Alliance

AGENDA

- Shuttle Processing
  - Integrated Operations — J. Vevera
  - Launch and Landing — M. Leinbach
  - Summary — D. King, E. Adamek, C. Murphy

PROCESSING DIFFERENCES

Presenter:
Jim Vevera
Organization/Date:
Ground Ops/08-01-01

Processing Differences - VAB / Pad

- Planned
  - Payload Late Access Platform (PLAP) Fit Check
  - V1034 Orbiter Frequency Response Test

- Unplanned
  - MDM OA-1 Replacement/Retest
  - SSME Pressure Transducer Replacement/Retest
  - APU 2 QD MD 21 Replacement/Retest
  - Control Room Swap (CR-1 to CR-3)
  - Late LH 16 MM Separation Camera Installation
  - Master Event Controller #1 Replacement Retest

STS-105 / OV-103
Operations Summary

OPR: USA - J. Vevera, INTG FM(1-2567)
NASA - E. Mango, PH(1-9221)

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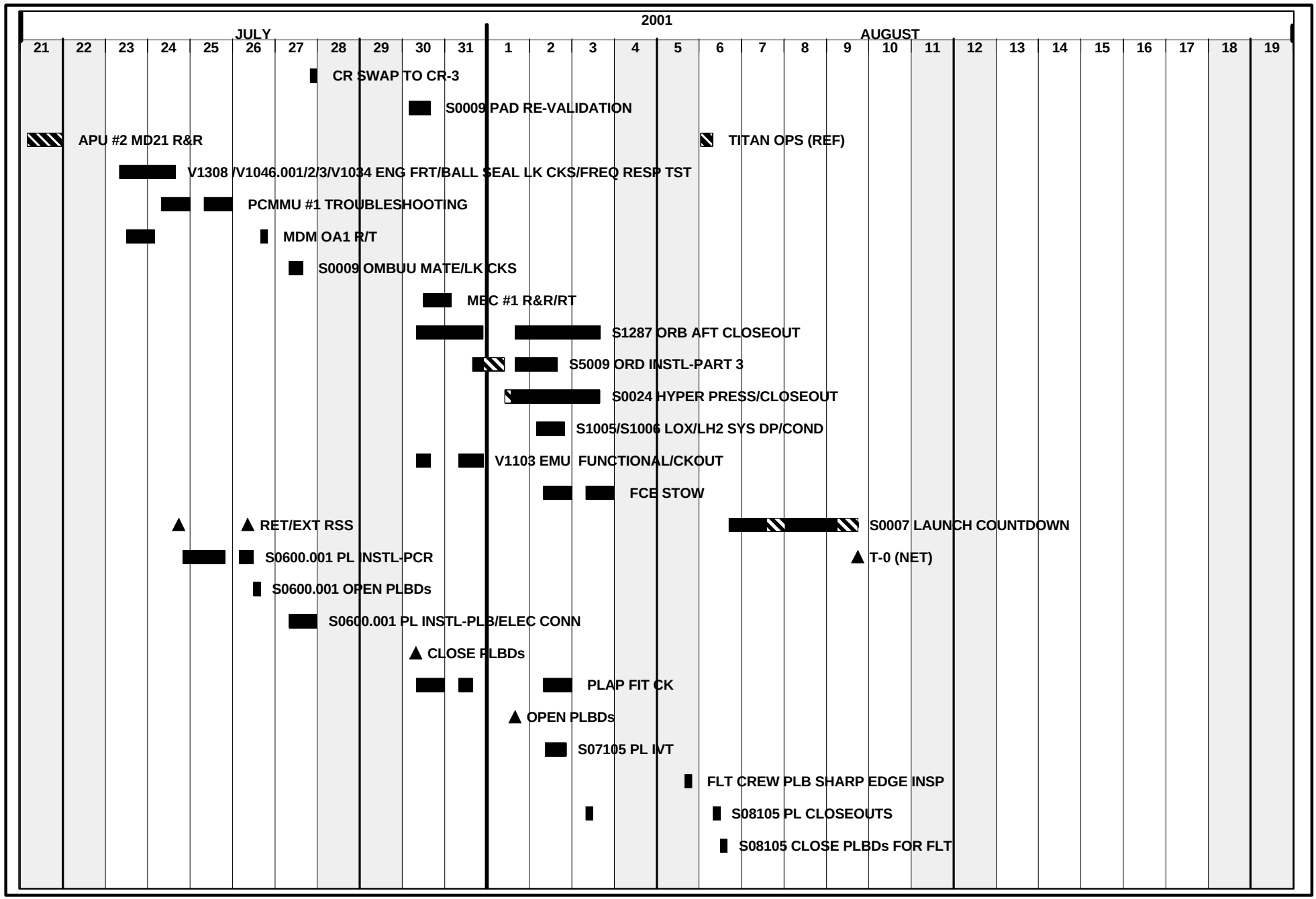


SHUTTLE ENGINEERING OVERVIEW

Presenter:
Rich Millang

Organization/Date:
Ground Ops/08-01-01

The following Topics have been reviewed:

• Requirements Status – OMRS	No Issues
• TOPS Status	No Issues
• GLS	No Issues (in backup)
• Software, SCAN, and Configuration Status	No Issues
• Vehicle/GSE Modification Status	No Issues
• In-Flight Anomaly Status	No Issues
• Lost Item Problem Reports	No Issues (in backup)
• Time/Life Cycle	No Issues
• Critical Process Changes	No Issues
• Unexplained Anomalies	To Be Presented
• Safety, Quality, and Mission Assurance	No Issues
• Engineering Topic	No Issues

UNEXPLAINED ANOMALIES

Presenter:
Rich Millang
Organization/Date:
Ground Ops/08-01-01

- Deferred – 2
  - *IPR-105V-0005 Right Hand OMS Vapor Iso Valve 2 Indicated Close When Commanded Open
  - *IPR-105V-0013 MADS FDM Mux 2B BITE failed on Two Consecutive Occasions
- Closed – 1
  - *IPR-105V-0006 Cabin DP/DT & PPO2 Sensor C Dropped to Lower Limits
- Open – 1
  - IPR-105V-0038: PCMMU 1 has Bad Data coming to the Firing Room 1

* UAs were presented at the Rollout Review and are in backup

UNEXPLAINED ANOMALY PCMMU 1 DATA PROBLEM

Presenter:
Rich Millang

Organization/Date:
Ground Ops/08-01-01

- Observation
  - During initial Orbiter power up, after switching to Firing Room 1, signal drop outs were noted on PCMMU 1 128 kbs line to Firing Room 1
- Concerns
  - Loss of Orbiter data to Firing Room 1 during power on testing
- Discussion
  - No previous occurrence of this type failure
  - Firing Room swap does not affect signal path from PCMMU to the remote controlled video switches in the LCC
  - LCC INS-01 requires 2 of 2 PCMMU's

UNEXPLAINED ANOMALY PCMMU 1 DATA PROBLEM

Presenter:
Rich Millang

Organization/Date:
Ground Ops/08-01-01

- Actions Taken
  - Trouble Shooting consisted of line checks from the LCC to the PCMMU 1
    - All lines and equipment from MLP Terminal Distributor Panel 9086B4 (connects to GSE T-O umbilical cable) to the Firing Room have been exonerated
    - Resistance checks done at the terminal distributor (9086B4) into the PCMMU 1
      - Open found on the Hi Side of the 128 kbs signal path
  - Connector at the PCMMU 1 was demated and inspected
    - No anomalies noted

UNEXPLAINED ANOMALY PCMMU 1 DATA PROBLEM

Presenter:
Rich Millang
Organization/Date:
Ground Ops/08-01-01

- Actions Taken (Cont'd)
  - A Break-Out-Box (BOB) installed at the PCMMU 1 output
    - BOB fuse installed, the signal was distorted on both the high and low sides
      - Signal displayed nominal amplitude
    - With fuse removed, the PCMMU signal was nominal on both high and low sides
    - Resistance readings on the 128 kbs and 64 kbs lines down to the MLP were nominal
  - Power cycling the PCMMU 1 and flex test of wire harness
    - Aft: 1307B/H to T-0 interfaces
    - Fwd: Avionics Bay 1 to ECLSS Bay
    - Midbody and ECLSS Bay not inspected/wiggled
    - No drop out or degradation of signal in the firing room

UNEXPLAINED ANOMALY PCMMU 1 DATA PROBLEM

Presenter: Rich Millang

Organization/Date: Ground Ops/08-01-01

- Actions Taken (Cont'd)
  - Additional detailed flex test/inspection of Avionics Bay 1 wire harness from PCMMU 1 to Avionics Bay sidewall
  - Performed detailed inspection and wire pull test of the backshell/connector for possible defects
    - No problems found
- Actions Planned
  - Maximize power on time on PCMMU 1 before S0007
  - Process the IPR as a deferred UA
  - Recommend launching and flying on PCMMU 2
    - PCMMU 2 signal path has had no anomalies
- Most Probable Cause
  - Intermittent signal path

UNEXPLAINED ANOMALY PCMMU 1 DATA PROBLEM

Presenter:
Rich Millang

Organization/Date:
Ground Ops/08-01-01

- Risk Assessment
  - Very Low
    - The distorted signal was only noted in the ground OI circuit of the PCMMU 1, the Orbiter Network Signal Processor (NSP) circuits never exhibited signal distortion
    - PCMMU 2 has no failures (Installed 1/05/91)

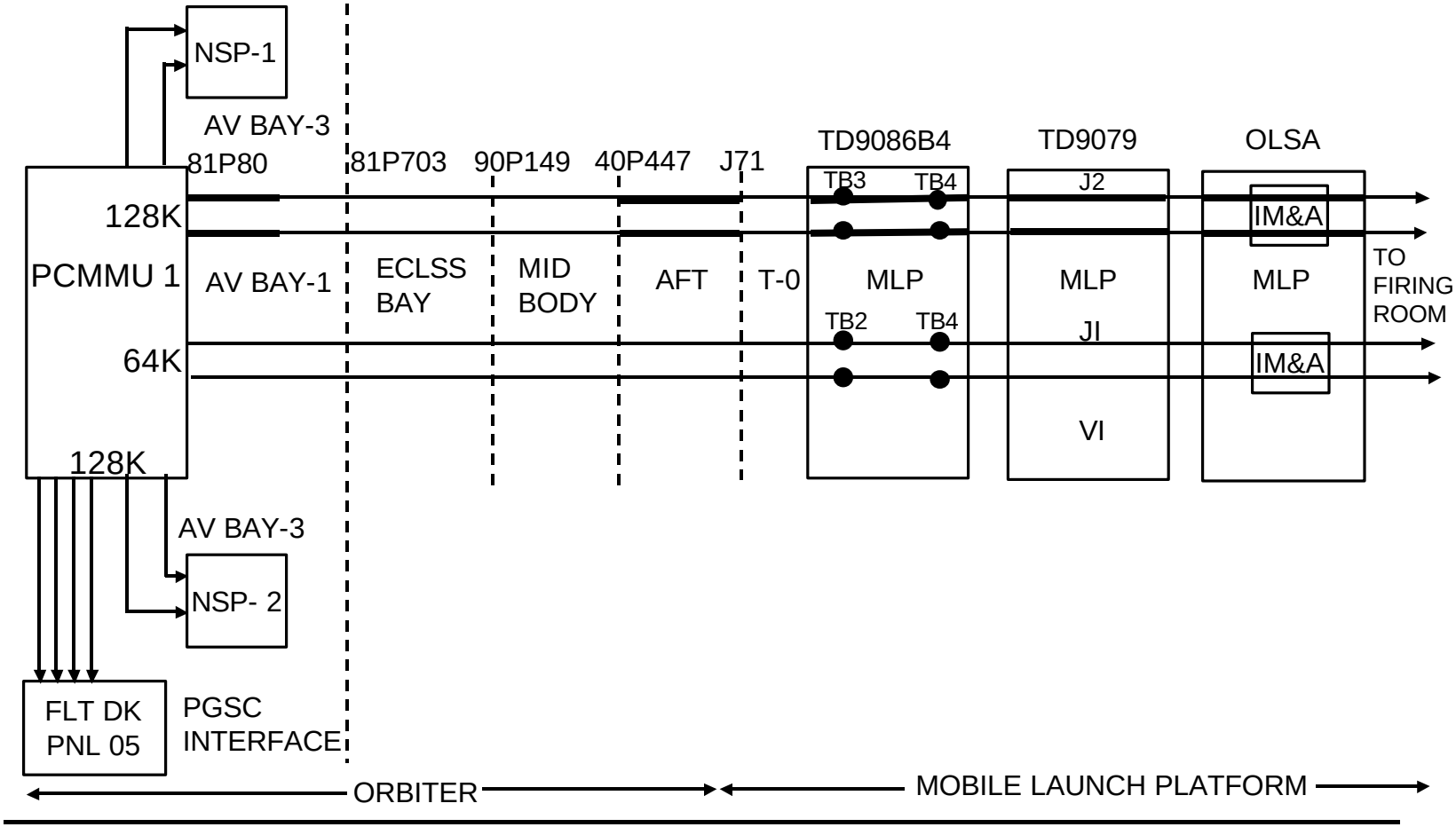
- Flight Effect
  - The observed signal distortion on PCMMU #1 affects ground processing telemetry only. No effects on flight

UNEXPLAINED ANOMALY
PCMMU 1 DATA PROBLEM

Presenter:
Rich Millang

Organization/Date:
Ground Ops/08-01-01

PCMMU DATA LINE ROUTING



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STS-105 / OV-103
Launch Countdown Summary

OPR: S. Altemus (1-9302)
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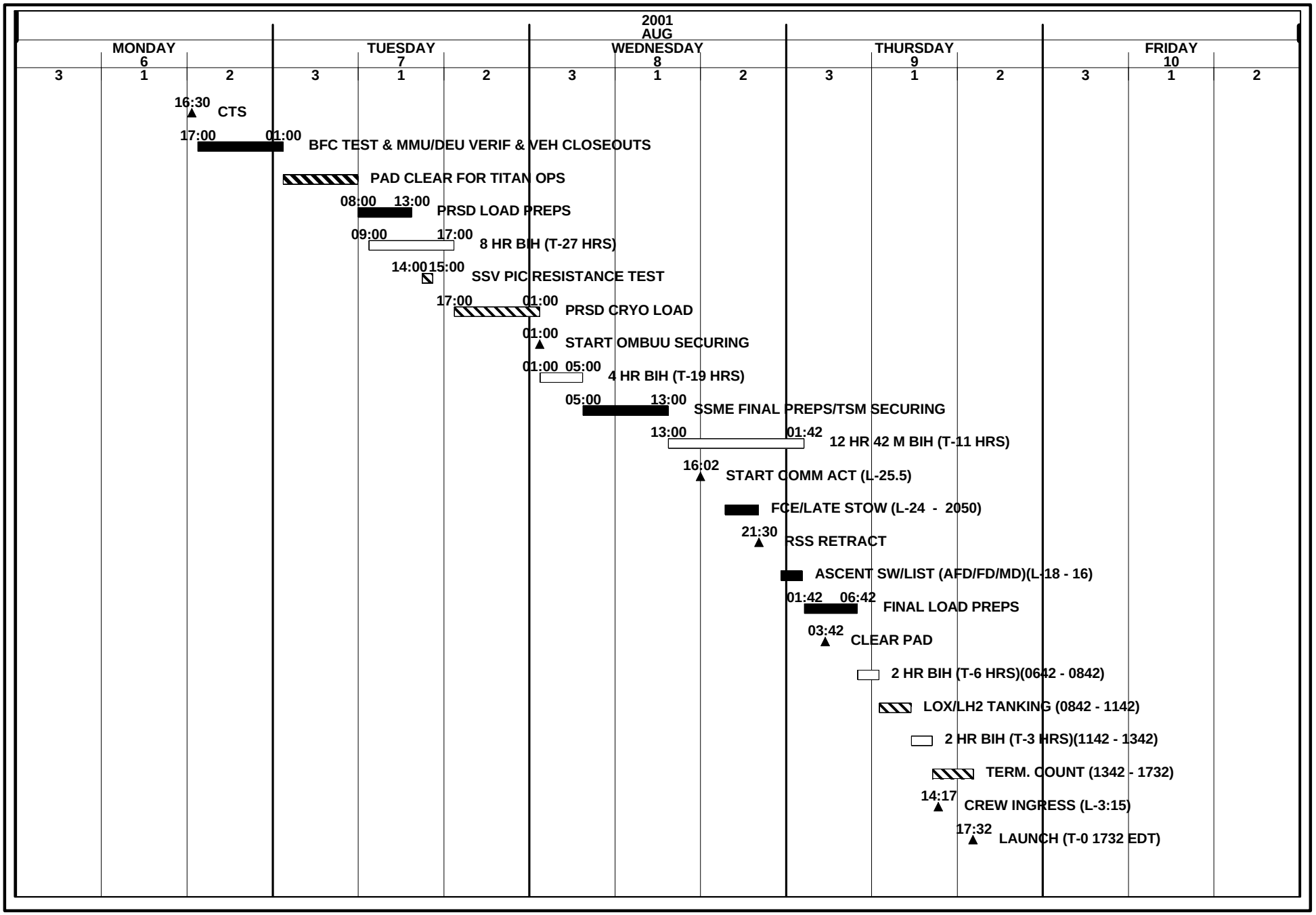

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NOTE:
Actual scrub turnaround timelines will be determined realtime based on specific conditions encountered.

STS-105

LAUNCH COUNTDOWN TURNAROUND OPTIONS

OPR: S. Altemus 1-9302

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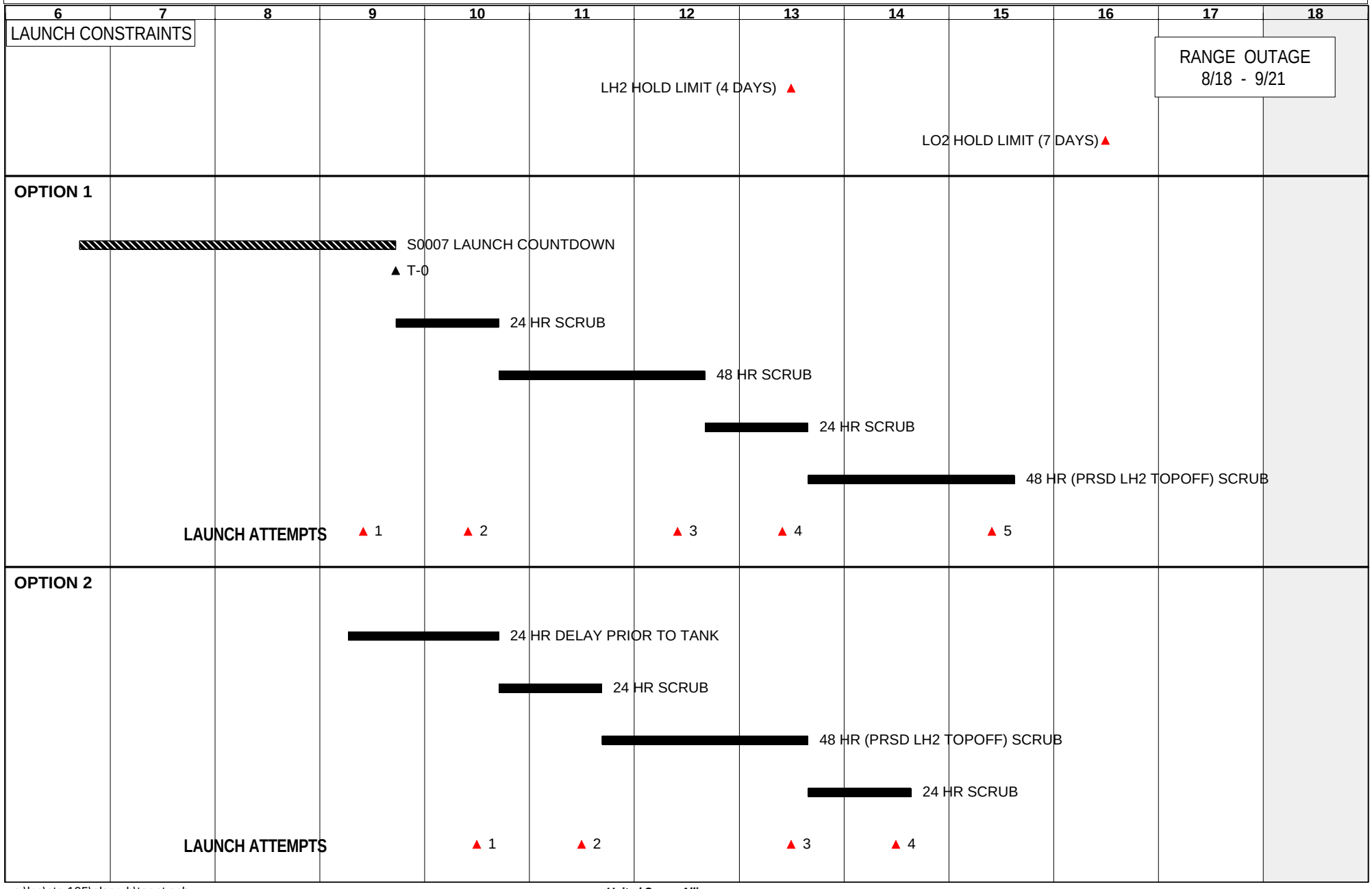


LANDING OPERATIONS STATUS

Presenter:
Mike Leinbach

Organization/Date:
Launch & Landing/08-01-01

- Launch Support
  - **RTLS**: KSC
  - **TAL**:
    - Zaragoza (Prime) — Deploy at L-6 days, Aug 3, 2001
    - Moron — Deploy at L-6 days, Aug 3, 2001
    - Ben Guerir — Deploy at L-7 days, Aug 2, 2001
  - **AOA**:
    - KSC (Prime)
    - WSSH (Alt) — Deploy at L-2 days, Aug 7, 2001
- Mission Support
  - KSC (Prime EOM)
  - DFRC/EDW — Deploy at L-2 days, Aug 7, 2001
  - WSSH
- Site Status
  - Zaragoza TACAN support

Kennedy Space Center
Shuttle Processing Team

STS-105 Readiness Statement

This is to certify that appropriate CoFR items from NSTS-08117 Appendices H and Q, Flight Preparation Process Plan, have been reviewed and dispositioned. Subject to completion of planned work and resolution of any identified constraints, KSC Shuttle Processing and Supporting Organizations are ready to support Launch Operations.

S/John Presnell for

Charlie W. Murphy
APM, Integrated Logistics,
USA.

S/Paul E. Adamek

Paul E. Adamek
APM, Ground Operations,
USA.

S/David A. King

David A. King
Director of Shuttle Processing,
NASA

STS-105

FLIGHT READINESS REVIEW

August 1, 2001

Ground Operations
Back-Up Charts

LOST ITEM PROBLEM REPORTS

Presenter:
Rich Millang
Organization/Date:
Ground Ops/08-01-01

Lost Items Not Found (7 Total)

Summary/Conclusion for all LAF PR's

- A thorough search of each area was unsuccessful in finding/retrieving the lost items
- System Engineering evaluations have concluded no adverse effect on Orbiter system operations

FWD (Airlock)

- PR –LAF-3-30-0621 Unable to locate V828-643143-001 duct strap from the airlock
  - Weight: 14.7 grams
  - Size: 0.6" x 19.5"

LOST ITEM PROBLEM REPORTS

Presenter:
Rich Millang
Organization/Date:
Ground Ops/08-01-01

FWD (Airlock) (Cont'd)

- PR-LAF-3-30-0623 Missing CWC after destow
  - Weight: 6.1 grams
  - Size: 0.9" OD

- PR-LAF-3-30-0625 2 snap links missing after destow
  - Weight: 0.9 grams
  - Size: 0.31"x 0.44"

- PR-LAF-3-30-0626 Com cable missing after destow
  - Weight: 105.6 grams
  - Size: 4 ft long

LOST ITEM PROBLEM REPORTS

Presenter:
Rich Millang
Organization/Date:
Ground Ops/08-01-01

AFT

- PR- LAF-3-30-0617 — A washer was dropped in the area around mid-deck platforms
  - Weight: 6.1 grams
  - Size: 0.9” OD

- PR-LAF-3-30-0618 — 5 screws were found missing during FES topping core heater cover removal
  - Weight: 0.6 grams ea
  - Size: 0.6”x 0.3” ea

LOST ITEM PROBLEM REPORTS

Presenter:
Rich Millang
Organization/Date:
Ground Ops/08-01-01

AFT (Cont'd)

- PR- LAF-3-30-0622 APU 3 heat shield has missing tangs
  - Weight: Less than a gram
  - Size: 0.5" x 1.5"

FUEL CELL RUNTIME

Presenter:
Rich Millang
Organization/Date:
Ground Ops/08-01-01

Fuel Cell (FC) Runtime Contingency

- Present Runtime Hours
  - FC 1 s/n 760110 Installed 07-09-99
  - FC 2 s/n 760124 Installed 12-14-00
  - FC 3 s/n 760122 Installed 07-01-99

- Planned FC runtime usage - 336 hours
  - 11 day mission + 2 Weather Contingency + FC Start/Landing

- Runtime on each FC
  - FC 1 1021 hrs
  - FC 2 334 hrs
  - FC 3 1016 hrs

UNEXPLAINED ANOMALIES RIGHT HAND OMS VAPOR ISO VALVE 2 INDICATED CLOSE WHEN COMMANDED OPEN	Presenter: Rich Millang
	Organization/Date: Ground Ops/08-01-01

- Observation
  - During STS-102 the right OMS vapor isolation valve 2 did not indicate open for the last two OMS Engine burns (MER-16)

- Concerns
  - Valve not opening, resulting in a loss of redundant flow paths

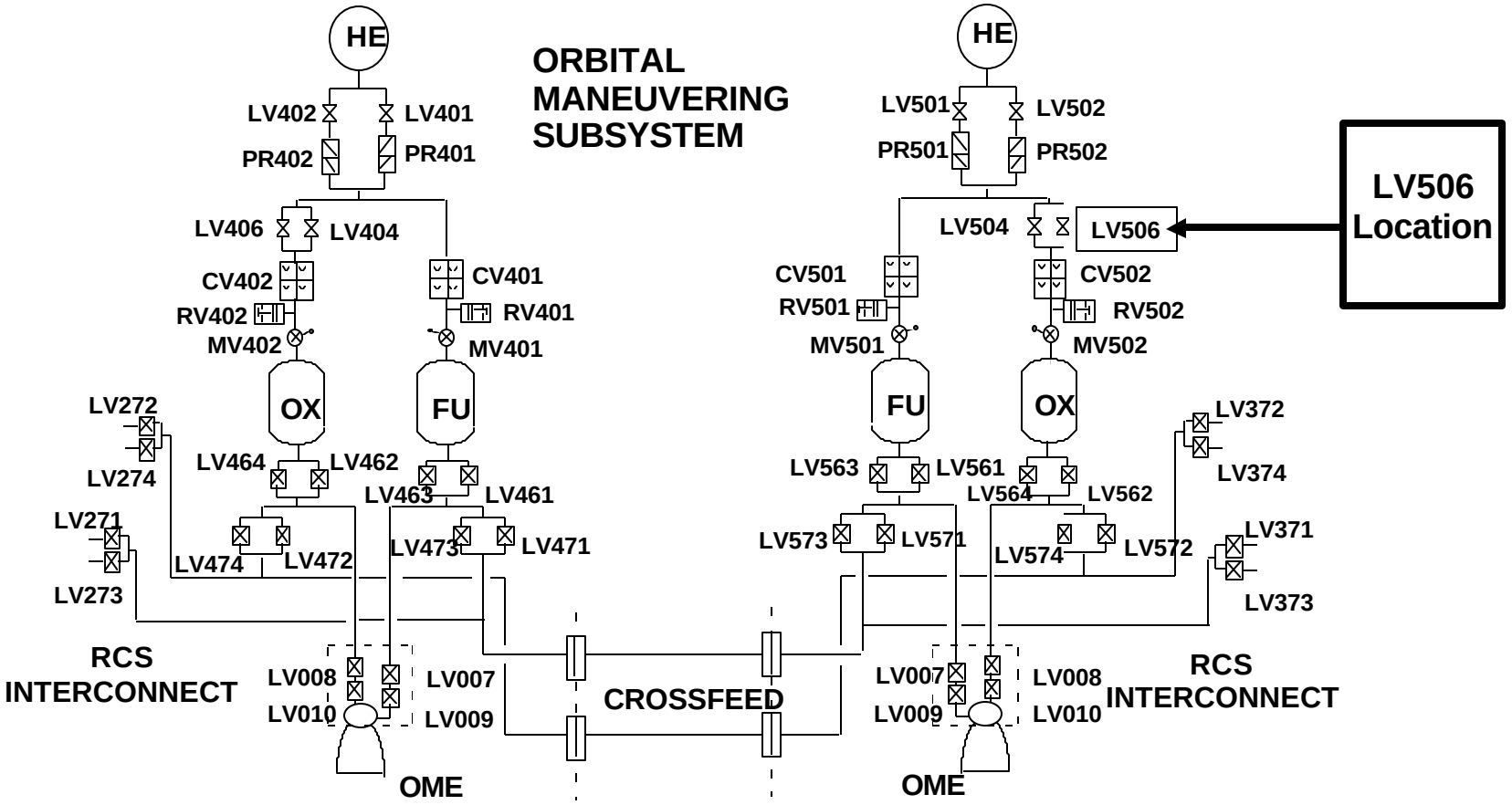
UNEXPLAINED ANOMALIES RIGHT HAND OMS VAPOR ISO VALVE 2 INDICATED CLOSE WHEN COMMANDED OPEN (CONT'D)	Presenter: Rich Millang
	Organization/Date: Ground Ops/08-01-01

- Actions Taken
  - Data review of the current draw at the time of occurrence were consistent with previous OMS burns
  - The Pod interface connector was demated and inspected and no anomalies noted
  - Break-Out-Boxes (BOBS) were installed to take reading while the valve commands was being sent, all reading were nominal
  - Wiggle test was done on electrical harness from Pod I/F to Avionics Bay 6, all indications were nominal
  - Review of SCAN showed no history of connector demate since STS-92

UNEXPLAINED ANOMALIES
RIGHT HAND OMS VAPOR ISO VALVE 2 INDICATED CLOSE WHEN COMMANDED OPEN (CONT'D)

Presenter:
Rich Millang

Organization/Date:
Ground Ops/08-01-01



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UNEXPLAINED ANOMALIES RIGHT HAND OMS VAPOR ISO VALVE 2 INDICATED CLOSE WHEN COMMANDED OPEN (CONT'D)	Presenter: Rich Millang
	Organization/Date: Ground Ops/08-01-01

- Prior Occurrence
  - No prior occurrences are documented for a Vapor Isolation Valve failing to indicate open when commanded open
- Most Probable Cause
  - An intermittent circuit with in the VPI or solenoid circuit

UNEXPLAINED ANOMALIES RIGHT HAND OMS VAPOR ISO VALVE 2 INDICATED CLOSE WHEN COMMANDED OPEN (CONT'D)	Presenter: Rich Millang
	Organization/Date: Ground Ops/08-01-01

- Rationale for Flight
  - Should the valve fail to open, a redundant parallel flow path for the oxidizer tank pressurization is provided by the Vapor Iso Valve 1
  - Tank pressures verified at least one flow path was open during the anomaly
  - There is no history of a Vapor Iso Valve failing open or closed
- Risk Assessment
  - Very Low
    - Redundant Flow Path
    - All circuit have been checked out per OMRSD
- Flight Effect
  - None

UNEXPLAINED ANOMALIES (MADS) FREQUENCY DIVISION MULTIPLEXER (FDM) FAILED ON TWO CONSECUTIVE OCCASIONS	Presenter: Rich Millang
	Organization/Date: Ground Ops/08-01-01

- Observation
  - During MADS system power up, the MADS FDM MUX 2B BITE circuit output indication remained “Fail” on two consecutive occasions
- Concern
  - Loss of MADS Mux 2B data
- Discussion
  - MADs FDMs and associated measurements are CRIT 3/3
  - The FDM BITE circuit monitors for nominal voltage level of the signal to the MCM
  - The BITE indications for MUX’S A, C and D of FDM 2 as well as all the FDM 1 BITES were found to behave nominally

UNEXPLAINED ANOMALIES (MADS) FREQUENCY DIVISION MULTIPLEXER (FDM) FAILED ON TWO CONSECUTIVE OCCASIONS (CONT'D)	Presenter: Rich Millang
	Organization/Date: Ground Ops/08-01-01

- Actions Taken
  - Troubleshooting to date has performed approximately thirty power cycles of the FDM system, examined the T-O output signal for the FDM 2B Mux and performed a bay 8 area flex test of the wiring harness containing the BITE output signal
  - The MADS system has also been powered up on several occasions and left on for up to twelve hours without a re-occurrence of the anomaly

- Most Probable Cause
  - Failure of the FDM internal BITE circuitry

UNEXPLAINED ANOMALIES (MADS) FREQUENCY DIVISION MULTIPLEXER (FDM) FAILED ON TWO CONSECUTIVE OCCASIONS (CONT'D)	Presenter: Rich Millang
	Organization/Date: Ground Ops/08-01-01

- Rationale for Flight
  - Failure occurred during the same time period (two consecutive FDM power applications) and numerous efforts to duplicate it have been unsuccessful
  - The MADS FDMs have been powered up in excess of thirty times with nominal results since occurrence of the anomaly
  - The MADS FDMs and associated measurements are CRIT 3/3 and system failure will not affect the crew or the mission
  - Failure of the FDM BITE indication is not a constraint to launch
- Risk Assessment
  - Very low
- Flight Effect
  - None

UNEXPLAINED ANOMALIES CABIN DP/DT & PPO2 SENSOR "C" DROPPED TO LOWER LIMITS	Presenter: Rich Millang
	Organization/Date: Ground Ops/08-01-01

- Observation
  - During STS-102 landing operation, the Cabin DP/DT sensor and PPO2 'C' sensor went to lower limits after the side hatch was opened
  - Circuit breaker on Panel O15 was found open post OPF Roll in

- Concerns
  - Reduced visibility on PPO2 and Cabin pressure sensors

UNEXPLAINED ANOMALIES CABIN DP/DT & PPO2 SENSOR "C" DROPPED TO LOWER LIMITS (CONT'D)	Presenter: Rich Millang
	Organization/Date: Ground Ops/08-01-01

- Actions Taken
  - Review of data shows no current spikes that would indicate circuit overload
  - The circuit breaker has been cycled several time with no anomalies noted
  - SCO indicated the circuit breaker operations felt normal
  - The circuit was powered ON during OPF power up testing and no anomalies noted

UNEXPLAINED ANOMALIES CABIN DP/DT & PPO2 SENSOR "C" DROPPED TO LOWER LIMITS (CONT'D)	Presenter: Rich Millang
	Organization/Date: Ground Ops/08-01-01

- Most Probable Cause
  - Inadvertent circuit breaker opening
    - Based on the high level of activity in the immediate area of panel O15

- Rationale for Flight
  - No anomalies in the sensor outputs have been detected during power up
  - The circuit breaker checks show no off nominal conditions
  - Cabin DP/DT or PPO2 C provides no input to the O2/N2 control panel as does sensors A and B

UNEXPLAINED ANOMALIES CABIN DP/DT & PPO2 SENSOR "C" DROPPED TO LOWER LIMITS (CONT'D)	Presenter: Rich Millang
	Organization/Date: Ground Ops/08-01-01

- Risk Assessment
  - Very low
    - These measurements do not have any inputs to the control of the cabin atmosphere
    - No repeat of the anomaly has been seen during OPF power up
- Flight Effects
  - None

GROUND LAUNCH SEQUENCER

Presenter:
Rich Millang
Organization/Date:
Ground Ops/08-01-01

Ground Launch Sequencer Configuration for STS-105

- GLSDD (KLO-82-0071A) Rev 8, Change D, June 2001

SSID / OMRS	Description and Remarks
• Standard Mask Items	
ECL-40	FCL 1&2 FPV will be in interchanger position
CT-01	Tacans 1&2 are Goulds
PAY-02	Payload Aux. RPC B-ON
PAY-02	Payload Aft Main C Power ON

GROUND LAUNCH SEQUENCER

Presenter:
Rich Millang
Organization/Date:
Ground Ops/08-01-01

Ground Launch Sequencer Configuration for STS-105 (Cont'd)

- GLSDD (KLO-82-0071A) Rev 8, Change D, June 2001

SSID / OMRS	Description and Remarks

- Bypass – 3
  - Photo Camera sequence on longer required an LPS signal
  - Bypass setting GCU 1, not required for 1203 GCU
  - GCDKTIM4E – Timer no longer required by NTD

OPERATIONAL READINESS ZARAGOZA, SPAIN TACAN

Presenter: Mike Leinbach

Organization/Date: Launch & Landing/08-01-01

- Issue
  - STS-104 launch supported with non-redundant TACAN at Zaragoza
  - Site team not advised, Launch/Flight Control team not advised
- Zaragoza TACAN
  - NASA owned, Spanish Air Force (SAF) operated and maintained
  - Redundancy required (dual string) for launch support
- Current Status
  - Spanish Air Force repair complete 07/30
  - OMI, DDMS checklist and SAF procedures enhancement to reflect redundancy verification