



STS-118/13A.1 and PCS R10U MOD Flight Readiness Review



**JSC Mission Operations Directorate
Flight Director Office**

**DA8/M. Abbott, J. Montalbano, S. Stich
July 11, 2007**



**Mission Operations Directorate
Flight Director Office**

Agenda



- DA8 COFR Requirements/Endorsements
 - COFR Requirements/Endorsements Summary
 - New Operations - Flight Techniques & Joint Operations Panels
 - Space Flight Meteorology Group (SMG)
 - Flight Rules (Generic Volumes A, B, C, D; STS-118/13A.1 Annex)
 - Mission Staffing: Training/Certification/Work Guidelines Compliance
 - Non-Critical Processors/Applications
 - Emergency Mission Control Center (EMCC)
 - Safety Status Review and OCAD
 - Command Procedures
 - Contingency Shuttle Crew Support/Rescue Flight (STS-322)
 - FCOH (SSP & ISS)
 - Level II Actions
- Standard Open Work
- Non-Standard Open Work
- Exceptions
- Flight Readiness Summary





DA8 COFR Requirements/Endorsements Summary



DA8 COFR Requirements/Endorsements



| REQUIREMENT (SHUTTLE) | Flight Director | Program Integration | Ops Safety | SPAN | Space Flight Meteorology | Procedures | Team 4 | MOD Console | | | | | |
|--|-----------------|---------------------|------------|------|--------------------------|------------|--------|-------------|---|---|--|--|--|
| Non-Crit Processors/Applications | G | | | | G | G | | | G | Ready to support the flight | | | |
| EMCC | G | | | | G | G | G | | | | | | |
| Training - MCC/POCC | G | | | Y | G | | G | G | | | | | |
| Flight Rules | Y | | | | | G | | | | | | | |
| FTP - New Ops | G | | | | | G | | | Y | Non Standard Open work with expected resolution prior to flight. | | | |
| Flight Anomaly Resolution | G | | | G | | G | | | | | | | |
| Anomaly - Procedures | G | | | | | G | | | | | | | |
| Exceptions/Action Items from prior reviews | G | G | G | G | G | | G | | | | | | |
| CIL/Hazards | G | | G | | | G | | | R | Open work without expected resolution without assistance, prior to flight, or unavoidable constraint violation. | | | |
| No Constraints | G | G | | | | | | | | | | | |
| Level II Actions | G | G | | | | | | | | | | | |
| Mission Requirements | G | | | | | | | | | | | | |
| Exception/Resolution | G | G | | | | | | | | | | | |
| Command Procedures | G | | | | | | | | | | | | |
| Flt Prep Process Plan Requirements Met | | G | | | | | | | | N/A | | | |
| Contractor Process Insight | | G | | | | | | | | | | | |



DA8 COFR Requirements/Endorsements



| | | | | | | | | | | |
|--|---|---|---|---|---|---|--|--|---|---|
| Non-Crit Processors/Applications | G | | | | G | | | | G | Ready to support the flight |
| BCC | G | | | | G | G | | | | |
| Training - MCC/POIC/POCC | G | | | G | | G | | | | |
| Flight Rules | Y | | | | G | | | | | |
| JOP - New Ops | G | | | | G | | | | Y | Non Standard Open work with expected resolution prior to flight. |
| Flight Anomaly Resolution | G | | | G | G | | | | | |
| Anomaly - Procedures | G | | | | G | | | | | |
| Exceptions/Action Items from prior reviews | G | G | G | G | | G | | | | |
| CIL/Hazards | G | | Y | | G | | | | R | Open work without expected resolution without assistance, prior to flight, or unavoidable constraint violation. |
| No Constraints | G | G | | | | | | | | |
| Level II Actions | G | G | | | | | | | | |
| Mission Requirements | G | | | | | | | | | |
| Exception/Resolution | G | G | | | | | | | | |
| Command Procedures | G | | | | | | | | | N/A |





New Operations

(FTP and JOP Summaries in Backup Charts)



Ascent/Entry Agenda



- ET Photography/Launch Window
- New Operations
 - Advanced Health Monitoring System (AHMS)
 - DOLILU
 - ECO Sensor Instrumentation
 - Three-String GPS
- STS-117 MMT Post Flight Actions
- Spaceflight Meteorology Group (SMG)



ET Photography/Launch Window Summary



- Launch Period is officially August 7-9
 - Range conflict with Atlas on August 12
 - Conflict resolution in work, Atlas expected to move to August 24
- ISS Reboost Plan will provide FD 3 Rendezvous from August 7-22
 - 1.0 meter/second test burn on July 21
 - Approximately 4.0 meter/second reboost on July 23 (serves as EAS and VSSA FSE Jettison Sep burn as well)
 - Will work to schedule additional ISS reboost for launch delays
- Launch Date Summary
 - All launch dates in daylight from August 5 through September 5
 - Daylight ET Umbilical Photography: August 5 through September 10
 - » Optimal ET Umbilical Photography Lighting from August 13-30
 - Daylight ET Crew Handheld Photography: August 6-September 13
 - » Optimal Crew Handheld Photography Lighting from August 28-Sept. 13
 - Beta Angle less than 60 degrees during docked timeframe satisfied for August 5 through October 15 launches



ET Photography/Launch Window Summary



| Day | KSC Date | Rendz Day | ET Photo Umbilical | ET Photo Handheld | Open (EDT) | Open (GMT) | In-Plane (GMT) | Close (GMT) |
|-----------|-------------|--------------|-----------------------|----------------------|---------------|---------------|-------------------|----------------|
| Tuesday | 7-Aug | FD 3 | Daylight | Daylight | 18:57:17 | 22:57:17 | 23:02:17 | 23:07:17 |
| Wednesday | 8-Aug | FD 3 | Daylight | Daylight | 18:31:34 | 22:31:34 | 22:36:34 | 22:41:34 |
| Thursday | 9-Aug | FD 3 | Daylight | Daylight | 18:09:03 | 22:09:03 | 22:14:03 | 22:19:03 |
| Friday | 10-Aug | FD 3 | Daylight | Daylight | 17:43:20 | 21:43:20 | 21:48:20 | 21:53:20 |
| Saturday | 11-Aug | FD 3 | Daylight | Daylight | 17:20:48 | 21:20:48 | 21:25:48 | 21:30:48 |
| Sunday | 12-Aug | FD 3 | Daylight | Daylight | 16:56:00 | 20:56:00 | 21:01:00 | 21:06:00 |
| Monday | 13-Aug | FD3 | Daylight | Daylight | 16:32:35 | 20:32:35 | 20:37:35 | 20:42:35 |
| Tuesday | 14-Aug | FD 3 | Daylight | Daylight | 16:06:52 | 20:06:52 | 20:11:52 | 20:16:52 |
| Wednesday | 15-Aug | FD3 | Daylight | Daylight | 15:44:21 | 19:44:21 | 19:49:21 | 19:54:21 |
| Thursday | 16-Aug | FD3 | Daylight | Daylight | 15:18:38 | 19:18:38 | 19:23:38 | 19:28:38 |
| Friday | 17-Aug | FD3 | Daylight | Daylight | 14:56:07 | 18:56:07 | 19:01:07 | 19:06:07 |
| Saturday | 18-Aug | FD 3 | Daylight | Daylight | 14:30:24 | 18:30:24 | 18:35:24 | 18:40:24 |
| Sunday | 19-Aug | FD 3 | Daylight | Daylight | 14:07:53 | 18:07:53 | 18:12:53 | 18:17:53 |
| Monday | 20-Aug | FD 3 | Daylight | Daylight | 13:42:10 | 17:42:10 | 17:47:10 | 17:52:10 |
| Tuesday | 21-Aug | FD3 | Daylight | Daylight | 13:19:39 | 17:19:39 | 17:24:39 | 17:29:39 |
| Wednesday | 22-Aug | FD 3 | Daylight | Daylight | 12:53:58 | 16:53:58 | 16:58:58 | 17:03:58 |

NOTES:

- 1) All launch dates are in daylight from August 5 through September 5
- 2) ET Umbilical Photography is in Daylight for August 5 through September 10 launches
- 3) ET Crew Handheld Photography is in Daylight for August 6 through September 13 launches.
- 4) Optimal ET Umbilical Photography Lighting occurs for August 13 through August 30 launches
- 5) Optimal Crew Handheld Photography Lighting occurs for August 28 through September 13 launches
- 6) Beta Angle less than 60 degrees during docked timeframe satisfied for August 5 through October 15 launches
- 7) Launch times shown are for a Flight Day 3 Rendezvous with no use of the FD 4 pane

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New Operations – AHMS



- STS-118 is first flight of active vibration redline for Advanced Health Monitoring System (AHMS) on all three SSMEs
 - Plan developed through Ascent/Entry Flight Techniques Panel (AEFTP) and briefed at January 18, 2007 PRCB
 - Active synchronous vibration redline mitigates HPOTP and HPFTP catastrophic risk (23% reduction in overall engine risk)
 - MCC can monitor synchronous vibration data like other SSME redlines
 - Flight rules implemented in Volume A, PCN 7 (STS-116 and subs)
 - No updates to crew procedures or Launch Commit Criteria (LCC)
- Accelerometer qualification limit lowered from 0.35 g to 0.25 g for STS-118
 - On STS-116, single accelerometer disqualified during throttle bucket due to quiet pump (redline active with 2 accelerometers)
 - Disqualification of vibration redline (2 accelerometers) determined to be greater than the risk of a bad accelerometer
 - Reviewed at AEFTP #232 (June 29, 2007)
- SSME Project Open Work: Review of STS-117 post flight data on left and center SSMEs, which flew in monitor mode



New Operations – DOLILU



- First flight on new Linux Platform as part of DOL Equipment Replacement 3 (DOLILU Block Update 2007.01)
 - Certified on March 28, 2007
 - AIX legacy system available for a next day launch attempt should Linux system have uncorrectable issues
 - Plan reviewed at AEFTP #229 (March 30, 2007)
 - Details provided in DM Presentation
- First flight with High Resolution Flight Element (HRFE) GPS balloons as prime
 - STS-116 and STS-117 utilized parallel operations with legacy Jimspheres and HRFE (Jimspheres prime)
 - STS-118 and STS-120 will utilize HRFE as prime with Jimspheres available as back-up source for DOLILU
 - Flight experience has demonstrated that HRFE and Jimsphere data are of similar quality and reliability.
 - After STS-120, pending favorable results and AEFTP review, Jimspheres will be retired
 - Reviewed at numerous AEFTPs including #229 on March 30, 2007 and #232 on June 29, 2007



New Operations – ECO Sensor Instrumentation



- STS-118/13A.1 is first flight of MPS ECO voltage monitoring system installed on both the LO2 and LH2 ECO sensors (MCR 23448 / TAD 30070)
 - Voltages down listed in OI telemetry and available in MCC
- LCC for ECO Sensor Voltage Monitoring reviewed at April 5, 2007 PRCB.
 - PRCB determined that ECO instrumentation could be used to determine failed wet sensor when the instrumentation is reading ~14.0 volts dc (open circuit).
 - Operations and Engineering community directed to formulate an LH2 ECO voltage LCC, which will not be implemented in GLS (a manual call), to protect for 14 volt open circuit condition, time ending at T-5 minutes and counting.
 - Program will accept the risk of ECO sensor failures after T-5 minutes
 - Community could not reach agreement on LCC at Noon Board on July 9, 2007
 - Launch Integration Manager will recommend to Program Manager that there should be no LCC for STS-118
- STS-118 Annex Rule states that ECO Sensor voltage monitoring system will not be used to determine ECO Sensor functionality during powered flight
 - Plan is to collect data for a few missions and determine whether system is useful for detecting a failed wet sensor
 - MCC can detect COM faults, failed dry sensors, and power fail in Point Sensor Box (wet sensor) without instrumentation

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New Operations – Three String GPS



- STS-118 is first 3-String Global Positioning System (GPS) flight with no TACANs on OV-105
- GPS will be prime navigational tool during entry
- Ramp up missions have successfully demonstrated Single-String GPS performance during entry
 - STS-121 used GPS in BFS after high speed tracking evaluation
 - STS-115 and STS-116 used GPS in the PASS in OPS 3 prior to the deorbit burn and during entry after high speed tracking
 - STS-117 used GPS in the PASS/BFS in OPS 3 prior to the deorbit burn and during entry after high speed tracking
- GPS Plan similar to STS-115 and STS-116 Single String Operations
 - PASS only prior to deorbit burn in MM301
 - PASS only post confirmation with high speed tracking for EOM, PLS
 - For TAL, ECAL, ELS incorporate provided data valid (LRU to LRU and GPS to Pass Nav compare)
 - Plan is to remain inhibited in the BFS to provide non-GPS navigation source.
 - » Manage BFS navigation with PASS to BFS state vector transfers.
 - » For BFS engage evaluate GPS per PASS criteria and incorporate
- Plan trained in STS-118 flight specific simulations and generic simulations since January 2007

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New Operations – Three String GPS (cont)



- Other mission specific items for first Three String GPS flight
 - Post undocking during OPS 201, plan to incorporate GPS for ~6 hours
 - Plan to leave all three GPS strings powered with pre-amps on for entire mission (cryo budgeted pre-mission)
 - Power off GPS 1 Upper and GPS 3 lower pre-amps for 24 hours during undocked operations to characterize GPS 1/GPS 3 antenna patterns.
- Volume A Flight Rules PCN-8 (May 24, 2007) contains numerous updates for GPS operations
- LCC: Seven LCCs modified and approved at Noon Board on May 23, 2007
 - Overall philosophy is same as TACAN and would launch with a single GPS LRU failed provided that high speed tracking was scheduled for EOM
 - Two new LCCs (CT-11 and DPS-28) for OV-105 only for 3-String GPS.
 - Good visibility in OPS 1 including data valid flag, RPU fail flag, FOM, state vectors.
 - Other changes indicated that OV-103/OV-104 are only vehicles with TACANs.
- FDF- Hundreds of pages of FDF affected
 - Requires OV-103/OV-104 and OV-105 specific pages
 - Majority of FDF changes in place since January 2007 for use in generic sims



New Operations – Three String GPS (cont)



- Space Shuttle Program requested mission duration flight rule for STS-118/13A.1 with regard to GPS failures (in STS-118 Flight Specific Annex)
- The following mission duration guidelines apply for GPS receiver failures:
 - For single GPS receiver failed continue to nominal End of Mission (EOM)
 - For two GPS receivers failed perform a Minimum Duration Flight (MDF)
 - For three GPS receivers failed:
 - » Provided that complete redundancy exists in end to end MCC delta-state command capability perform an MDF
 - » If complete redundancy in end to end MCC delta-state command capability does not exist deorbit at the next PLS
 - When early mission termination is required, deorbit will occur on an opportunity that maximizes on-orbit C-band/Low-Speed TDRS and entry high speed tracking
- If 2 or 3 GPS receivers are failed, additional actions will be performed to maximize accuracy of the on-board state vector:
 - More frequent state vector uplinks to maintain nav accuracy for emergency deorbit
 - IMU inertial platform misalignment will be minimized to the extent possible prior to deorbit. Depending on in-flight IMU performance and star availability:
 - » Additional star alignments may be required
 - » Pre-deorbit burn align may be moved closer to deorbit burn to minimize platform drift



New Operations – Three String GPS (cont)



- Three String GPS system sensitive to Master Timing Unit (MTU) Failures
 - Requires aiding from legacy navigation system to determine satellite locations
 - When MTU fails GPCs default to internal time and have higher drift rates with respect to real time
 - Age of aiding (measure of difference between GPC and GPS time) must remain within -5 ms and 400 ms for GPS to function properly (per vendor).
 - If Age of Aiding less than -960 ms or greater than 1900 ms, GPS considered failed
- GNC, DPS, GUIDANCE developed procedures to maintain GPC time within age of aiding limits for landing (reviewed at AEFTP #224 November 17, 2006)
 - OPS 2 time adjust modifies GPC time to maintain GPC within limits
 - OPS 3 delta-time uplink to preserve GPS aiding prior to and during entry if required
- Procedures successfully tested/executed during June 29, 2007 SAIL test (only facility that can fail the MTU)
- Annex Flight Rule 13A.1_A8-2 GPS Systems Management with Timing System Failures documents actions
- Software fix in OI-32 (STS-120) eliminates the need for MCC uplinks



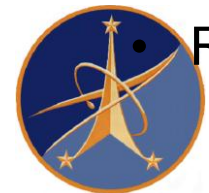
STS-117 Pre-Launch MMT Post Flight Actions



- STS-117 Mission Management Team (MMT) Action S063568B to:
 - Review Radar Altimeter (RA)/Microwave Landing System (MLS) LCC/Flight Rules.
 - Assess capabilities and redundancy of landing systems and revise requirements and rationale and if appropriate report results to the Daily PRCB.
- After a thorough review at A/E FTP #233 (7/2/2007), the Panel concluded:
 - Current LCC (1 of 2 RA acceptable if all three MLS available; 2 of 3 MLS acceptable if 2 of 2 RA available) is correct risk trade
 - » Maintains near two-fault tolerant for precise altitude data for TAL and EOM day/night landings within the capability of the current avionics architecture
 - Flight rules not completely clear on RA/MSBLS rationale,
 - » RA or MLS altitude highly desirable for night landings and desired for day landings
 - » Loss of all MLS/RAs is piloting task/workload issue (ball-bar still available)
 - Total RA or MLS failures will remain nominal EOM since avionics design would result in early mission termination for loss of single LRU
 - » Window of exposure small since equipment powered off for majority of flight (RA's on from launch through PI, MLS nominally off until FCS Checkout).
 - Post STS-118, rule and LCC will be updated to include importance for daylight landings and improve rationale
 - Existing GPS not sufficient to function as an MLS replacement and extensive analysis and certification required. Due to limited program life, GPS certification as an MLS replacement should not be pursued.

• Results presented at July 9, 2007 Noon Board and Program action closed

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Spaceflight Meteorology Group (SMG)



- All NWS/SMG software used to create mission critical products or used for mission support ready for STS-118/13A.1.
- All SMG forecasters required to support STS-118/13A meet currency requirements listed in SMG Training & Certification plan.
 - CONUS and TAL forecasters certifications are current.
 - Three lead forecasters in training scheduled to be on-orbit certified for STS-118.
- No non-standard open work or exceptions
- Previous open work to reduce TAL support problems
 - Procedures implemented for STS-117 to reduce numerous TAL balloon problems encountered on STS-116 were marginally effective.
 - Experienced personnel had greater impact upon problem resolution.
 - Continue to work with DOD Human Spaceflight weather personnel to improve performance
- MIDDs release 19.2 baselined June 25.
 - Minor fix to GUI used primarily by MIDDs operators

The undersigned certifies that the Spaceflight Meteorology Group is ready to support the STS-118/13A.1 flight.

/s/ Frank C. Brody

Frank C. Brody

Chief, Spaceflight Meteorology Group

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New Operations –SSPTS



- Station to Shuttle Power Transfer System (SSPTS)
 - OV-105/Endeavour is the first Orbiter to be outfitted with Power Transfer Units (PTUs)
 - ISS wiring reconfiguration was performed by the Expedition 14 crew (Lopez-Alegria and Williams) during USOS EVAs 7 (Feb 4) and 8 (Feb 8)
- Provides up to 4 channels of power transfer from ISS, at up to 2 kW each
 - STS-118/13A.1 planning assumed 2 converters, limited by ISS availability
 - Likely to be able to activate 3 converters (to be confirmed in real-time)
- Activation will occur on FD3, shortly after docking
 - After activation of Orbiter OPCUs, ISS RPCM closures starts the flow of power
 - OPCU voltage is then adjusted upwards (ground command) to maximize ISS supply usage and offload fuel cells
 - All converters will be powered off for EVA 1 (ISS power limitation due to SARJ lock)
- MOD is working with Engineering and Program elements to define success criteria for declaring SSPTS operational to support MMT decision on mission extension (expected FD4 or FD5)
- Flight rules and procedures
 - Developed and included in the generic flight rules (volume A, PCN-8) and FDF
 - One flight-specific rule: 13A.1_C9-2, which documents expected ISS power availability



New Operations - Focused Inspection Plan



- Focused Inspection is scheduled in the Flight Plan
 - FD5 is dedicated for Focused Inspection, if required
 - Dependent on receipt of requirement for Focused Inspection by the end of FD3 (as documented in Flight Rule 13A.1_C2-27, FOCUSED INSPECTION SCHEDULING)
 - If Focused Inspection is not required, the crew time will be replaced with transfer ops
- FD5 provides sufficient time to protect repair/CSCS options whether SSPTS is operational or not
 - FD6 – EVA2 conducted, as planned, while FI analysis is performed
 - FD7 – Repair Decision
 - Assuming SSPTS is operational, either EVA 3 or EVA 4 could be used for repair operations, depending on the extent of the repairs
 - For a no-SSPTS case, EVA 3 would be used for repair operations
 - Content for the remainder of the mission would be refined based on the extent of damage and required repairs



New Operations – Stage



- PMA 3 Relocation
 - Required prior to STS-120/10A
 - Cleaning of Node Nadir CBM seals planned for US Stage EVA #9 on 23 July
 - STS-118/13A.1 can be performed with PMA 3 at the port or nadir location
- FBG Solar Array Retract
 - Arrays must be retracted prior to deploying the additional P1 and S1 radiators. The Starboard radiators are planned for deploy during 10A and the port radiators are planned for deploy post Node 2 relocation to Lab forward.
 - The task is nominally IVA. A contingency EVA to manually retract the FBG arrays will be scheduled if the automatic retraction fails.
 - Once the FBG arrays are retracted, the USOS will always supply 2 ARCUs
- PCS R10U
 - See DF Charts
- All open work will be statused at IMMTs until complete



Flight Rules



- All required generic volume A, B, C, and D flight rules have been developed, reviewed, and approved by the appropriate Flight Techniques Panels, JOPs, and the FRCB
- The following generic publications are applicable for STS-118/13A.1
 - Volume A, Final 2002, PCN-8 dated 5/24/07
 - Volume B, Final PCN-2, dated 6/28/07 (possible PCN-3 prior to flight)
 - Volume C, Final PCN-2, dated 11/20/06
 - Volume D, Final PCN-1, dated 1/16/07
- STS-118/13A.1 flight rule annex
 - Final version approved at 7/2/07 JPRCB
 - PCN-1 targeted for presentation at 7/30/07 JPRCB
 - All required flight-specific rules to support the STS-118/13A.1 mission have been worked through the appropriate Flight Techniques Panels, GJOP, and 118/13A.1 JOP, and are either developed/approved or are in work to support the mission



FDF/ODF



- FDF/ODF will be ready to support STS-118/13A.1
 - Three String GPS and Space Shuttle Power Transfer System (SSPTS) required significant FDF updates which are all complete
- Procedures
 - New US procedures for increment 15 are for PMA3 relocation

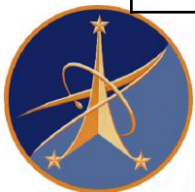


Flight Director Mission Staffing: Training/Certification/Work Guideline Compliance



- All STS-118/13A.1 Flight Directors are certified per Flight Director Certification Guide (DA8-00010), Final, dated February 2, 2007
- Additional certified Flight Directors are available to support Team 4, EMCC, and STS-322, as required
- All MOD Work Guidelines are met: Due to the expected mission duration, Shuttle Orbit 2 and Shuttle Planning teams are covered by 2 Flight Directors each (see below)

| Flight Director | Position | Flight Specific Cert Status |
|------------------|--|-----------------------------|
| Matt Abbott | Shuttle Lead, Orbit 1 | Anticipated July 20, 2007 |
| Steve Stich | Ascent/Entry | Anticipated July 20, 2007 |
| Richard Jones | Shuttle Orbit 2 (FD1 - FD6) | Anticipated July 20, 2007 |
| Mike Sarafin | Shuttle Orbit 2 (FD7 - EOM) | Anticipated July 20, 2007 |
| Mike Moses | Shuttle Planning (FD1 - Undock) | Anticipated July 20, 2007 |
| Paul Dye | Shuttle Planning (Pre-launch; post-undock - EOM) | Anticipated July 20, 2007 |
| Rick La Brode | Shuttle "Team 4" | Anticipated July 20, 2007 |
| Joel Montalbano | Station Lead, Orbit 2 | Anticipated July 20, 2007 |
| Kwatsi Alibaruho | Station Orbit 1 | COMPLETE |
| Ginger Kerrick | Station Planning | Anticipated July 20, 2007 |
| Derek Hassmann | Station "Team 4" | Anticipated July 20, 2007 |



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SPAN Mission Staffing: Training/Certification/Work Guideline Compliance



- Sufficient personnel will be provided by the Organizations to properly staff all SPAN positions without violating Work Guidelines



Non-Critical Processors/Applications



- All DA8 Non-Critical Applications certified
- No application changes since STS-117



EMCC



- No changes to EMCC procedures since STS-117
- Personnel identified to support EMCC

SAFETY ISSUES



- RS Computer System Failure
 - Root Common cause unknown
 - If consider RS computer system 0 Failure tolerant several hazards have insufficient controls in place -- Implications still in discussion
- SARJ/TRRJ Position MAR Calibration errors
 - SARJ FDIR may not detect
 - Can lead to significant SARJ position error with GNC impacts
 - ASCB approved a PPL to open FDIR limits
- MT Translation is zero fault tolerant (RPCM R&R planned)
- S5 PVRGF Tool fit (issue on 12A.1)
 - Must be removed to allow resumption of BGA rotation
- Laser Safety for Trajectory Control Sensor (TCS)
 - S&MA is awaiting the revised SAR
- Presence of Payload Tox-4 Batteries
 - MISSE PEC 3 & 4 (approved by JPRCB)
 - CSLM-2 ECU (in review)



Open OCADs



- PHALCON (5)
 - Mate/demate pwr inhibit
 - Partial Retract PVR constraints
 - LS Constraints
- EVA (11+1)
 - Min EDFs/bolts constraints
 - Jammed EDF/shim/bolt/FRAM responses
 - CMG Htr no touch constraint
 - ESP3 carrier min safe return config
 - Failed CETA boogie wheel response
 - Tether temp stowed CMG
 - Punch tool constraints
- ADCO (1)
 - Min CMG bolts for ops
- OSO (7)
 - CAS Latching constraints
- ROBO (3)
 - Limp for 2nd stage CAS Latching
 - Energy management constraints
- ODIN (3)
 - CAS Latching cmd requirements
- EGIL (2)
 - Main Bus tie constraints
- MMACS (1)
 - T-handle/window pyro constraints



Command Procedures



- Personnel are prepared and ready to execute the command procedures as documented per MOD Command Policy/Flight Rules.



Contingency Shuttle Crew Support/STS-322



- Contingency Shuttle Crew Support (CSCS) /Rescue Flight Resource Book is located at http://mod.jsc.nasa.gov/da8/rules/CSCS_Rescue_Flight_Resource_Book/cover.htm
- STS-118 Ascent/Entry Team will support STS-322
- STS-118/120 Teams will support Orbit Operations as required



Flight Controller Ops Handbook (FCOH)



- FCOH procedures are ready to support STS-118/13A.1
- SSP FCOH (JSC-26843) - Last updated 05/25/07 in support of 117/13A
 - Individual procedure updates on Web site at http://mod.jsc.nasa.gov/da8/FCOH/ssp_fcoh/SSP_FCOH_TOC.htm
 - Book Manager will incorporate any updates required for STS 118/13A.1
- ISS FCOH (JSC-29229)
 - ISS FCOH is always up to date on Web site at http://mod.jsc.nasa.gov/da8/FCOH/iss_fcoh/ISS_FCOH_TOC.htm
 - Book Manager will incorporate any updates required for STS 118/13A.1



Level II Actions



- As of 7/09/07, there are no Space Shuttle Program “Open Actions/Constraints to Flight” assigned to MOD for STS-118/13A.1
- As of 7/09/07, there are no Space Station Program “Open Actions/Constraints to Flight” assigned to MOD for STS-118/13A.1





Standard Open Work



Standard Open Work



- Flight Rules
 - 118/13A.1 Annex Rules PCN-1 (CR Cutoff 7/09/07, 7/30 target JPRCB date)
 - Significant Ascent/Entry CRs as a result of STS-117 MMT
 - » Landing Site Selection Rule - clarify compromised orbiter definitions
 - » Next PLS Rule-clarify as a result of STS-117 MMT (working with MMT chairman to finalize rule)
 - List of CRs for PCN-1 are included in backup charts
 - No significant issues expected; some open CRs are dependent on analysis that may not be complete in time for PCN-1
 - Some CRs will not meet PCN-1 Cutoff date, requiring PCN-2 at a special JFRCB



Standard Open Work



- FDF/SODF
 - Final FDF updates including ascent checklist updates based on Flight Design Uplink Cycle
 - Final SODF updates
- Final LCC Updates (July 10, 2007 Noon Board)
 - Deletion of IMU Back-Up Fan Verification
 - NNE Wind Limit Change to 23 knots
- Training
 - Complete STS-118 Ascent/Entry and Orbit integrated simulations (8/1E)
 - Complete Flight Director flight specific certifications (7/20E)



Standard Open Work



- Verification of final safety hazard reports and NCRs vs flight products
 - MOD Integrated Cargo Hazard Assessment (ICHA)
 - » STS-118 Verification Tracking Log (07/27/07)
 - MOD Integrated Experiment Hazard Assessment (IEHA)
 - » ISS FLT 13A.1 Verification Tracking Log (07/27/07)
 - Independent Safety Verification Review
 - » Shuttle ISVR Report (08/01/07)
 - » ISS ISVR Report (08/01/07)
- ISS reboosts on July 21 and July 23 to set up FD 3 rendezvous for first fourteen days of launch period
- Finalize pressure management plan for docked mission
- Finalize power profile plan for docked mission
- Complete “Road To” Items





Non-standard Open Work



Non-Standard Open Work



- None



Exceptions



- None – See Division charts



Flight Readiness Summary



- Pending completion of all standard and non-standard open work, the Flight Director Office and Space Flight Meteorology Group are ready to support the STS-118/13A.1 mission
- All standard/non-standard open work will be closed out or have a closure plan prior to Level 1 FRR (7/25-26/2007)





Backup



Open Work – Flight Rules PCN-1

Open CRs as of 7/9/07



- Shuttle-only Flight Rule CRs
 - 13A.1_A10-X Antenna Stow Requirements Exceptions
 - 13A.1_A2-X Landing Site Selection Entry Public Risk Update
 - 13A.1_A8-3 GPS System Management
 - 13A.1_A8-X Mission Duration Impacts for 3 String GPS Failures
 - 13A.1_A2-X Next PLS Requirements/TPS Damage



Open Work – Flight Rules PCN-1 (cont'd)

Open CRs as of 7/9/07



- ISS-only Flight Rule CRs

- 13A.1_B1-1 Delete FR 13A.1_B1-1 because covered in Generic Vol B
- 13A.1_B2-X Add ESP-2 ORU/FRAM hardware install constraints
- 13A.1_B2-5 13A.1 Permissible ISS Stage Attitudes and Attitude Deviations
- 13A.1_B2-34 Update to 13A1_B2-34 Array Bias Restrictions
- 13A.1_B8-X USTO pulse pattern constraints
- 13A.1_B8-1 Updated 13A.1 Stage USTO controller usage
- 13A.1_B10-X Add 13A.1_B10-X N1 MDM Failure During CBM Operations
- 13A.1_B10-X Add CR 13A.1_B10-X PMA3 Relocate Response to CBM Failures
- 13A.1_B15-X Add new EMU Go-No Go Rule for EMU Glove cuts
- 13A.1_B18-X Add Radiator Venting Criteria Rule to 13A.1 Annex
- 13A.1_B18-1 Manual TRRJ Positioning
- 13A.1_B19-X Add MELFI RPC Management FR from 13A Annex
- 13A.1_B19-X Add MELFI FRs from the 13A Annex
- 13A.1_B19-X Add MELFI 8 hour Power off Constraint
- 13A.1_B19-3 Update MELFI Power Down Constraints



Open Work – Flight Rules PCN-1 (cont'd)

Open CRs as of 7/9/07



- Shuttle-ISS Joint Operations Flight Rule CRs
 - 13A.1_C2-X Add FR with UMA thermal constraints for ESP-3 installation
 - 13A.1_C2-X ESP-3 Contingency Management
 - 13A.1_C2-41 Update Drag-through Cables Flight Rule
 - 13A.1_C2-42 Shuttle Halon Restriction for STS-118/13A.1
 - 13A.1_C2-81 13A.1 Mated Attitudes and Attitude Constraints
 - 13A.1_C2-81 Stbd SARJ Position and Rotation Constraint
 - 13A.1_C2-82 Add EWIS to LTA rule
 - 13A.1_C2-85 S5 Installation
 - 13A.1_C2-91 Updates to Exercise Constraints
 - 13A.1_C2-156 Joint Mission USOS Solar Array Constraint Contingency Response
 - 13A.1_C8-X 13A.1 Analyzed CMG momentum capability
 - 13A.1_C8-1 Orbiter DAP Modes and Priorities



Open Work – Flight Rules PCN-1 (cont'd)

Open CRs as of 7/9/07



- Shuttle-ISS Joint Operations Flight Rule CRs (cont)
 - 13A.1_C8-2 Mated USTO control usage
 - 13A.1_C8-11 Orbiter Attitude Control and Maneuver Constraints and Priorities
 - 13A.1_C10-1 Hook Requirements Update
 - 13A.1_C10-2 118 APU Operation While Docked
 - 13A.1_C11-3 Shuttle Ku-band radiation limits
 - 13A.1_C12-X SSRMS/OBSS Reberth Constraints
 - 13A.1_C12-X MSS Thermal Constraints
 - 13A.1_C12-4 Update OBSS Overnight Park positions
 - 13A.1_C15-X Add MISSE Retrieval Constraints Rule
 - 13A.1_C2-156 Delete 13A.1_C2-156 Array Constraint Contingency Response
 - 13A.1_C15-X Shuttle Ergometer for Exercise P/B Constraints
 - 13A.1_C19-1 ER4 Docked Power Constraints



Remaining STS-118/13A.1 Integrated Sims



- Orbit
 - None
- Ascent/Entry
 - 7/10: Deorbit Prep Simulation
 - 7/13: FDO/BSE Simulation
 - 7/16: Post Insertion
 - 7/19: TCDT with KSC
 - 7/26: Ascent #3
 - 7/30: Entry #3
 - 8/01: Ascent #4





Ascent/Entry Flight Techniques Topics Applicable to 118/13A.1



Ascent/Entry Flight Techniques Panel (AEFTP)



- Total of 2 Ascent/Entry Flight Techniques Panels (A/E FTPs) held in support of STS-118
 - A/E FTP #232 STS-117 Post Flight Review (6/29/2007) resulted in two IFAs
 - » STS-117-D-001: Pre-Launch the GNC (WFCR 2) Ascent LOC push button did not work correctly
 - » STS-117-D-002: GDR Data Dropouts During Ascent
 - A/E FTP #233 Review of MSBLS/RA LCC and Flight Rules (7/2/2007) in response to pre-launch MMT action
- No additional Ascent/Entry Flight Techniques Panels planned prior to STS-118 launch
- All required changes to Ascent/Entry flight rules, crew procedures, and MCC procedures have been dispositioned
- A/E FTP community ready to support STS-118 pending standard open work



A/E FTP #232 Summary



- STS-117 Post Flight (A/E FTP #232, 6/29/2007) - Reviewed mission support including trajectory and systems performance, Space Flight Meteorology, Landing Site and MCC/Network support.
- Significant Network issues associated with landing at Edwards AFB:
 - Weather Aircraft Comm: WX Capcom unable to communicate with T-38 or STA.
 - » Dryden upgraded to NTR but end to end checkout using an aircraft was not performed.
 - » Procedures updated to verify circuit integrity prior to use of a landing site.
 - UHF Echo: During landing minus 1 day comm checks, crew reported echo between UHF and A/G voice.
 - » Auto mode delay adjustment did not function due to Dryden configuration and manual workaround utilized and corrected the echo.
 - » STS-118 will utilize manual delay adjust.
 - Convoy Communications: No communication link between Flight Director and Convoy Commander due to a card failure at Goddard.
 - Radar Software Configuration: Configured to RIPS system for radar processing rather than DES system that NAV expected (noted during pre-launch checks).
 - » Implemented RIPS system software patch to correct format compatibility with JSC.
 - » DES system experienced an unexpected reboot during Entry and Dryden reconfigured to RIPS system with no impact to radar data.
 - » Network will determine configuration prior to STS-118 MOD FRR.

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A/E FTP #232 Summary (Continued)



- Significant Network issues associated with landing at Edwards AFB (cont):
 - Ground Receipt Time Delta: During entry a 2 second delta between ground receipt time and onboard time was noted
 - » Impacted DPS ability to monitor onboard GPC time health.
 - » Investigation in work by the Network.
- Significant MCC Issues:
 - GDR: FDO noted pre-launch and ascent GDR data dropouts using Traj Server 2 as prime.
 - » MOD IFA STS-117-D-001
 - » Mitigation steps to have users logout that were not required did not remedy the data anomaly.
 - » Observed data dropouts approximately every 20 seconds.
 - » Traj Server 3 was used for entry with no data quality impacts (loading is also substantially less)
 - » Troubleshooting in work to determine root cause but not held as a constraint to STS-118.
 - GNC Controllability Light: Hardware PBI did not function during pre-launch checkout.
 - » MOD IFA STS-117-D-002
 - » Workstation reboot finally restored function
 - » MCC troubleshooting procedures updated to include system engineer if present
 - » LCC & Flight Rule being reviewed to clarify redundancy required between MCC and Eastern Range
 - MCC Pre-launch UPS Failure:
 - » UPS system performed with no issues during STS-117.
 - » DV action to perform MPSR power separation at next available work window.
 - FCO Abort Switch: FCO lost heartbeat with FD Workstation on at least two occasions
 - » Recycle of software application corrected the problem



A/E FTP #233 Summary



- A/E FTP #233 (7/2/2007) reviewed MSBLS/RA Launch Commit Criteria/Flight Rules
 - STS-117 Mission Management Team (MMT) Action S063568B to review Radar Altimeter (RA) and Microwave Landing System (MLS) LCC and Flight Rules.
 - Assess the capabilities and redundancy of landing systems and revise requirements and rationale and if appropriate report results to the Daily PRCB.
- AEFTP determined current LCC CT-08/MEL-04 requirements (4 of 5 LRU's) appropriate
 - Maintains near two-fault tolerant for precise altitude data for TAL and EOM day/night landings within the capability of the current avionics architecture
 - Post STS-118: Update Notes to include importance for daylight landings and improve rationale
- Agreed to update A8-18 to state RA or MLS altitude data is highly desirable for night landings and update rationale to state desire for day landings
 - Loss of all MLS/RAs is a piloting task/workload not vehicle control issue
 - Crew can still land safely, but with increased risk and workload if no accurate altitude data is available (other than the ball bar)
- AEFTP determined there no change to mission duration rules are required
 - Total RA or MLS failures is nominal EOM since avionics design would result in early mission termination for loss of single LRU
 - After STS-118 during next Volume A Update, rationale will be updated to clearly articulate risk trades
 - Window of exposure to failures is small since equipment is powered off for majority of flight (RA's on from launch through PI).

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A/E FTP #233 Summary (Continued)



- A/E FTP #233 (7/2/2007) also reviewed GPS as possible alternative to MLS for landing
- GPS NOT certified to be an MLS replacement and is only certified as a TACAN replacement.
 - MLS Spec Accuracy: Altitude 3.5 ft, Crosstrack 17 ft, Downtrack 150 ft
 - GPS Spec Accuracy: FOM 5 with total error between 328 and 656 feet
- GPS can have accuracy that rivals MLS, but is not guaranteed to have that accuracy when it is required during landing.
 - Extensive analysis required to certify a lower FOM threshold, which would be required if GPS was to be used as an MLS replacement.
 - May not be possible to certify GPS to MLS accuracy and availability requirements with existing MAGR receiver.
- AEFTP determined that due to extensive analysis and certification work required and limited program life, GPS certification as an MLS replacement should not be pursued.





Orbit Flight Techniques and Generic JOP Topics Applicable to 118/13A.1





- The Orbit Flight Techniques Panel (OFTP) and Generic Joint Operations Panel (GJOP) conducted an STS-117/13A Post-Flight Review on July 9
- Several actions were assigned and forward work identified (publication of formal minutes and actions from the meeting are in work)
- STS-118/13A.1 team members are engaged and have either made appropriate changes or are directly involved in their resolution
- One Orbit-related MOD IFA was brought forward from STS-117
 - STS-117-D-003: Laser Camera Computer (LCC) Activation Turning Off WLES PGSC
 - » Description: FD2 LCC activation PGSC conflicts resulted in loss of several hours of WLES data collection
 - » Cause: Process Escape
 - Procedure was not cross-referenced against the PGSC software assignments on the PGSC usage chart
 - Constraints were not documented regarding the conflict with the LCC Activation and WLES operations
 - » Corrective Action Plan:
 - Community sensitized to multiple ops on the PGSCs at key times
 - P/TV procedures being updated to not require reboot of the PGSC during LCC Activation
 - WLES/ACO/FAO teams reviewing Timelines, procedures and PGSC usage plan to identify conflicts
 - Procedures and documentation are being corrected and verified for STS-118/13A.1
 - This IFA is not a constraint to STS-118/13A.1





STS-118/13A.1 Joint Operations Panel Topics



STS-118/13A.1 JOP Topics



- SSPTS
 - The JOP reviewed the basic plan for SPPTS operation at STS-118/13A.1 JOP #4 in November 2006
 - A final review of SSPTS operations, anomaly response, and procedures is planned for July 19
- JEE/JEUS
 - The JOP reviewed the basic plan for JEE/JEUS operations at STS-118/13A.1 JOP #7 in May 2007
 - The JEE/JEUS has been simmed with the STS-118/13A.1 teams on four occasions
- Attitude control handover DTO from Shuttle directly to CMGs
 - During STS-117/13A, attitude control handover from Shuttle to ISS could not be performed when the Russian computers were unavailable
 - Extended durations in Shuttle control impacted USOS power generation due to the added USOS solar array restrictions
 - Both Programs have requested that the teams assess the potential for a DTO to handover attitude control from Shuttle directly to CMG
 - OD is leading the coordination effort and plans to bring a status to the SORR on July 13, with JOP review to be conducted on July 19
 - Assuming the procedure is formally certified and prioritized, MOD has no issues performing this test
- Prop usage for mated stack control
 - During STS-117/13A, mated attitude control propellant usage was significantly higher than predicted
 - The cause of the additional usage is still under evaluation
 - The STS-118/13A.1 JOP will review the latest analysis on July 19





Russian Joint Operations Panel Topics Applicable to 117/13A



RJOP Topics



- STS-118/13A.1 Briefings to Russian Teams
 - In work and expected to be completed by launch minus 1 week

- STS-117/13A Lessons Learned
 - HSG workload increase due to reduced presence of ISS program representatives in Moscow
 - » In work and expected to be closed by July 20, 2007
 - Early review with Moscow of the power transfer plan
 - » In work and expected to be closed by launch minus 1 week
 - Develop a clear plan of Russian attitude control for CMG saturation
 - » In work with the ADCOs and expected to be closed by launch minus 1 week



RJOP – Russian Segment Status



- Russian Computer anomaly during STS-117/13A continues to be evaluated
 - No problems have been seen since the circuit protection was bypassed during the STS-117/13A mission
 - Moscow believes the Command Processing Unit (БOK-3) is the cause of problems with the Russian computer and plans to replace the БOK-3 and associated cabling to the Russian computers with spares which will be manifested on the next Progress.
 - New computers and a Command Processing Unit (БOK-3) are being flown on Progress 26 (expected docking on August 5)
- Kurs set #2 (used for automated rndz/docking) failed self test on GMT 186 (last week)
 - Set #1 full passed
 - Set #2 failed
 - Both sets are fully redundant
 - Kurs will be retested this week
 - No issue for STS-118/13A.1



SPAN Manning



- ISS SPAN Support: Manning provided by USA CAF Personnel
- ISS SPAN Systems: Manning provided by DF
- SSP SPAN Support: Manning provided by DA8 & DT
- SSP SPAN Systems: Manning provided by DF
- SPAN DO: Manning provided by DO
- SPAN DM: Manning provided by DM
- SPAN DX: Manning provided by DX
- SPAN Managers: Manning provided by DT, DF, DX, DO, DM



SAFETY STATUS OVERVIEW



DA8 COFR

| Category | HRs Open | NCR/AR Open | Open ISS OCADs | Open STS OCADs | Open ISVRs |
|-----------------------|----------|-------------|----------------|----------------|-------------|
| Shuttle Integration | 3 | 0 | - | 1 | 0 |
| Shuttle Orbiter | 0 | 2 | - | 3 | 0 |
| Shuttle SSME | 0 | 0 | - | - | - |
| Shuttle ET, SRB, RSRM | 0 | 0 | - | - | - |
| ISS 13A.1 | 8 | 2 | 35 | - | 45 (39 Pre) |
| GFE | | | | | |
| - EVA | 2 | 0 | 1 | 1 | 0 |
| - Shuttle | 8 | 0 | - | 0 | 0 |
| - Station | 2 | 0 | 1 | - | 0 |
| Payload | | | | | |
| - Shuttle | 0 | 1 | - | 0 | 0 |
| - Station | 5 | 1 | 0 | - | 0 |



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SHUTTLE SAFETY HIGH RISK



- Loss of TPS
 - IDBR-01
 - » ET Foam: Ice Frost Ramp, Intertank Flange
 - » ET Ice: Feed line bracket, feed line bellows, ET Umb
 - T.02 Foam
 - » Manual Sprayed and poured foam (not redesigned)
 - » External impact
 - » Design limitations
 - T.04 Ice
 - ORBI-007 MMOD
 - INEV-01 Bird Strike
- Explosion in the Aft Compartment
 - IMEO-01
 - ORBI-036
- Lag H2
 - IMPS-09
- Abort Risk (RTLs)
 - IGNC-01
- Lightening (all Mission Phases)
 - ILIT-01
- WSB freezing (Multiple APU cooling loss)
 - ORBI-344

SHUTTLE OPEN HAZARD REPORTS



- Integration
 - IFSW-01*
 - IFSW-02
 - IPYR-01*
- Orbiter
 - ORBI-111* COPV
 - ORBI-278* COPV
- ET
- SSME
- RSRM
- SRB

* Pre verified



ISS OPEN HAZARD REPORTS



- COL-1003* §
- ECL-0206* §
- EPS-0503* §
- EVA-0312*
- GNC-0701* §
- MCH-0109*
- NTN-001*
- TCS-0040*

* Pre-verified

§ Russian computer fault tolerance risks



ISS Open NCRS



| | |
|---------------|--|
| NCR-ISS-203-A | Lack of Two-Fault Tolerance to EVA Plasma Shock Hazard |
| NCR-ISS-204 | Lack of Two-Fault Tolerance to EVA Plasma Shock Hazard for Flight 13A.1 EVA1 |
| NCR-TBD | SARJ Locking Constraints Risk (not a constraint to launch) |



GFE Open Hazard Reports



- STS

- 90 Degree Camera Autotrac;
 - » New HR for Modified MiniCam used near Windows
- Laser Dynamic Range Imager (LDRI) - PRCB
- Battery Powered Speaker Microphone Unit (BPSMU)
 - » New BPSMU HR due to Battery Leakage Failure
- EVA Digital Camera
 - » Project has received approval to make the mods to the camera. RAESR will be updated accordingly 07/05/07
- Li-BCX D Cell
 - » The analyses require major changes & clarifications. Effectivity changed from STS-117 to STS-118 to allow additional time.
- Li-Fe Disulfide Cell
 - » Cell Cert closed prior to STS-117; EP5 needs to submit RAESR to NT for review. Sched. at risk. NT reviewed RAESR & provided comments to EP5. Awaiting EP5 responses, then process through FESRRP.
- SCEE Communications System
 - » Three integrated hazards exist regarding failure of the interfaces to send a signal to the SCCS. The project has not yet provided this information. Phase III FESRRP ECD is 07/13/07.
- LIBCX II C Cell
 - » The analyses require major changes & clarifications. Schedule at risk. Effectivity changed from STS-117 to STS-118 to allow additional time.



GFE Open Hazard Reports



- ISS

- Cycle Ergometer/Vibration Isolation system (CVIS) 07/25/07
- EVA Digital Camera
 - » Project has received approval to permanently require a tether for the camera, and to add double-sided tape between the rail and the camera body to prevent "wiggling." Cert updates are pending. 07/06/07

- EVA

- EVA Marker
 - » In concurrence
- EVA Punch Tool (EPT)
 - » In concurrence



PAYLOAD OPEN HAZARD REPORTS



- Shuttle
 - CSLM-2
 - » Accepted Risk HR for Lithium Thionyl Chloride ECU batteries
 - » PSRP approval, pending Shuttle Program approval (ECD: TBD)
- ISS
 - CBTM-02
 - » HR waiting on toxicology rating of samples
 - CCM-A
 - » PSRP waiting to review updated HRs

